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THE RADIOGRAPHIC DIAGNOSIS OF SYPHILIS, TUBERCULOSIS, TUMORS AND OSTEOMYELITIS OF THE LONG BONES.*

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As a plea that some important features of radiographic diagnosis deserve the serious attention of medical—and especially surgical—men generally, I beg to introduce my thesis by repeating here an earlier expression on

"THE INTERPRETATION OF RADIOGRAPHS."

"Cystoscopy has become so important a procedure in the diagnosis of diseases of the urinary tract that many surgeons have made themselves expert in its employment and are quite able to make their deductions from it, without the aid of specialists in the art. Radiography is employed much more often and in a much wider range of affections than is cystoscopy, yet how few surgeons have taken the trouble to become expert in the interpretation of *x*-ray pictures!

"To be sure, all surgeons see so many radiographs that they are quite able to diagnose from them the coarser lesions of the bones and of the thorax. Most of them are quite able to recognize the shadow of a calculus and many are shrewd enough to distinguish from it the shadow of a phlebolith in the pelvis. But in the more delicate interpretation of the X-ray shadings they all too often rely on the dicta of radiographists—many of whom are men of limited scope, and few of whom are balancing their work with daily bedside experience.

"To cite a concrete example: A patient is suffering with a pathological fracture of one of the long bones and physical signs fail to show just what the underlying lesion is. It may be, for example, a gumma, a sarcoma, or a carcinoma. The skiagraphs of these three bone diseases may look so much alike that a radiographist not very alert and experienced is apt to make the wrong diagnosis, and on his report a patient may be submitted to a mutilating operation for sarcoma who should have been treated by salvarsan and mercury, or managed conservatively because his carcinoma is metastatic. But bone sarcoma, cancer, gumma, however much they may look alike radiographically, can be distinguished *radiographically* by expert interpretation of the smaller details of the picture. Each of these lesions has certain characteristic and distinguishing features.

"We often hear men say, 'Oh, the *x*-ray is so misleading,' and they are, in truth, often misled, not by the *x*-ray, but by the faulty interpretation of its unerring traceries. No surgeon has provided himself with his full diagnostic equipment until he learns expertly to interpret these traceries."**

That surgeons, and even many radiographists, so often fail to recognize the skiagraphic features of bone syphilis is not surprising when we find that several *x*-ray text-books describe them insufficiently and that most surgical works say little or nothing concerning them. In Bevan's translation of Lexer's "General Surgery," published in 1908, the paragraph on diagnosis of syphilis of the bone dismisses the *x*-ray aspects with the sentence, "Roentgen-ray pictures reveal nothing characteristic"—which statement is quite the reverse of the truth.

The radiographic features of bone syphilis are so characteristic that in most cases the diagnosis can be made from the x-ray plate alone, without, or in the face of, clinical appearances and blood reaction. The exceptions to this rule are probably not more numerous than the exceptions to many other diagnostic signs and reactions.

I base this broad statement not only on my own experience, but also on the authority of other observers. Hahn and Deycke-Pascha,[1] Alban Köhler[2] and Martin Ware,[3] who were probably the first to formulate the radiographic tracings of bone syphilis, in 1906 and 1907, are likewise emphatic concerning their diagnostic value. I would amplify the deductions made by these writers by suggesting

* In part, from the surgical service of Dr. Lilienthal, Mt. Sinai Hospital. Some of the *x*-ray pictures have been courteously furnished by Drs. L. Jaches and I. S. Hirsch, radiographists, respectively, to Mount Sinai and Bellevue Hospitals, New York, and by Dr. Martin Ware.
Read, by invitation, at the Clinical Meeting of the Mount Sinai Hospital, Boston, February 17, 1913.

** Editorial, AMERICAN JOURNAL OF SURGERY, November, 1912.

that in those cases in which the diagnosis cannot be made from the radiogram the characteristic features are obscured rather than absent, and to a careful observer the plate will at least sufficiently indicate the possibility of syphilis to suggest a therapeutic or blood test.

Next, of course, to the microscopic study of the tissue removed by incision, radiography supplies the most reliable differentation between syphilis, osteomyelitis, sarcoma, carcinoma, cyst and tuberculosis of the bones. And because the skiagraphic features that distinguish these have not been generally learned, it is my purpose here to very briefly describe and contrast them so that "he who runs may read":

SYPHILIS of the bones is essentially a productive inflammation of the periosteum alone or of the periosteum and the bone itself. Two reactions characterize its radiographic picture. The most constant and most distinctive feature is thickening of the periosteum. The second and next most important feature is the thickening of the bony tissue, especially the cortex. Both of these produce black shadows on the *x*-ray plate. A third type of process, which may appear, by contrast, as a light area, is gummatous destruction of the bone.

The Periostitis may appear as a localized shadow (fig. 2) or in scattered areas (fig. 1), or it may cover the entire length of the diaphysis (fig. 3). It may appear over a circumscribed surface of the bone or, very often, it develops circumferentially (figs. 3 and 4). The shadow may be narrow, fairly paralleling the border of the corticalis (figs. 3 and 4)—"periostitis simplex luetica," or it may be broad and irregular; but in whatever form it appears its outline is distinct (contrast periosteal sarcoma).

Syphilitic periostitis begins next to the bone, as a subperiosteal infiltration. In an early stage, therefore, the radiogram may show the periosteal shadow, at this time usually narrow, lifted away from the bone. As the inflammatory process advances the periostitis (and its *x*-ray shadow) increases, often as the predominating lesion. It may thus acquire considerable density, as in the localized "periostitis gummosa." If a periosteal gumma produces a palpable mass the bulk of this mass, being only inflammatory, may cause no shadow on the plate. (Compare periosteal sarcoma.) A periosteal gumma may break down at the site where the inflammatory process is most active, viz., subperiosteally, as in Case II, described below. The reaction more often, however, takes the form of ossification —also beginning in the deepest layer,—the periosteal shadow then acquiring the density of bone shadow. In the ossifying process periosteum and cortex may fuse into a bony mass, appearing in the picture as a uniformly dense, structureless shadow—ossifying periostitis (fig. 6).

Ostitis. While in some cases of bone syphilis, notably in the early stages, the radiograph shows only the characteristic periostitis, in most there develops, or is seen at the outset, an also characteristic ostitis, marked by thickening of the substantia corticalis or of both the compacta and spongiosa. This process may be localized (fig. 5), or diffuse (fig. 3). The overgrowth of cortical bone may extend only externally (figs. 5 and 6), or internally, encroaching on or obliterating the medulla (fig. 1), or both externally and internally, sometimes as a symmetrical fusiform enlargement. At the site of the ostitis the bone becomes denser (sclerosis), producing a correspondingly denser shadow, in which the bone structure is lost. The ossifying process may involve the periosteum, fusing bone and bone covering in a solid mass, as above described. In long-standing cases the overgrowth of bone in its axial direction produces the elongation and bowing of the shaft described by Fournier, which is also characteristic of syphilis.

Gummata within the bones (ostitis,-osteomyelitis,-gummosa) when, instead of resolving, they go on to bone destruction, produce light areas in the *x*-ray negative, but these are surrounded by a dark shadow of reactive bone thickening, which quite distinguishes them from the light areas of bone absorption seen in radiograms of osseous tumors and tuberculosis. The plate will also reveal thickened bone substance and periostitis. Gummata are usually single in a bone, but sometimes multiple or confluent. They may be very small or involve enough of the bone thickness to cause pathological fracture (fig. 1). Occasionally the gumma surrounds an island of bone, causing it to appear in the radiograph as a sequestrum. But sequestrum formation is unusual in unmixed syphilitic osteomyelitis, which also contrasts it with tuberculous and pyogenic osteomyelitis.

The *Osteo-chondritis* of hereditary syphilis, which may be the only lesion found in fetuses, and which is sometimes accompanied, in infants, by pseudo-paralysis, also produces characteristic *x*-ray

[1] HAHN—Congress der Deutschen Röntgen Gesellschaft, 1906.
HAHN und DEYCKE-PASCHA—Knockensyphilis im Röntgenbild, *Fortschritte auf dem Gebiete der Röntgenstrahlen, Erganzungsband* 14, Hamburg, 1907. The reader is especially referred to this excellent monograph and atlas.

[2] KÖHLER—Typische Röntgenogramme von Knochengummen *Fortschritte auf dem Gebiete der Röntgenstrahlen*, Bd. X, 1906-7, pp. 73-77.
KÖHLER—In Lehmann's med. Atlanten, Bd. VII. *Atlas und Grundriss der Röntgendiagnostik*, herausgegeben von Franz Groedel, München, 1909.

[3] WARE—*Annals of Surgery*, August, 1907, pp. 199-205; *Surgery, Gynecology and Obstetrics*, January, 1908, pp. 9-14.

pictures, as demonstrated by Carl Hochsinger.[4] He found in fetuses and infants the following radiographic features: Marked thickening of the epiphyseal end of the diaphysis, the border of which appears very jagged instead of smooth; periostitis over the epiphyseal end of the diaphysis, the shadow varying in density in proportion to the deposit of osteophytes; irregular absorption of bone within the epiphyseal end of the diaphysis; the area of the epiphyseal cartilage much widened and with jagged borders; a shadow of callus formation if there has been epiphyseal separation.

Dactylitis (*spina ventosa*) in hereditary syphilis, essentially an osteo-chondritis, is notoriously difficult to distinguish, by its outward appearance alone, from tuberculous dactylitis. Although the radiogram occasionally shows borderline conditions of doubtful interpretation, it will usually establish the correct diagnosis. Ware has set forth with special clearness the contrasting radiographic features of (hereditary) luetic and tuberculous dactylitis:—

Tuberculosis originates in the epiphysis, syphilis in the epiphyseal end of the diaphysis. In tuberculosis there is little or no periosteal thickening, in syphilis the periostitis is marked. In tuberculosis there is a greater tendency to bone destruction, in syphilis to bone production. In tuberculosis the swelling is largely due to inflammation of the soft parts, in syphilis it is largely due to thickening of the bone. Suppurating sinuses are not uncommon in tuberculous dactylitis, they are in syphilitic dactylitis. Multiple dactylitis is usually not tuberculous, it may be syphilitic or rachitic. "In rachitis, where the pathological changes are also most active at the epiphyseal line, the *x*-ray generally shows a cup-shaped defect of the epiphyseal parts."

Joint Syphilis is more difficult to diagnosticate radiographically than syphilis of the bone shaft, partly, perhaps, because, being uncommon, one sees too few skiagrams of luetic arthritis to formulate their minuter features, and partly because joint syphilis not infrequently is an inflammation of the soft parts rather than of the osseous tissues. When the latter are clearly invaded, however, they produce the same type of reactions as seen in the *x*-ray examinations of syphilis of the shaft. In luetic arthritis, then, we note periosteal involvement and bone production. In tuberculous arthritis periostitis is absent or slight, and the bone shows irregular destruction, rather than production or mere rarefaction. Gumma of the articular end of a bone is recognizable in the picture. Destruction of the articular surface by gummous chondritis is, I believe, less easily distinguished. The terminal appearance of a syphilitic arthritis may much resemble, radiographically, that of an arthritis deformans.

In these cases, unless the picture bears the distinctive earmarks of bone syphilis, it is best to arrive at a diagnosis by balancing the radiographic with the clinical findings. Bilaterality of an arthritis or synovitis speaks for syphilis rather than tuberculosis. The anamnesis, the presence or absence of other syphilitic lesions and the reaction to the Wassermann tests cannot here be ignored.

Osteo-porosis, sclerosis, caries are the end products of syphilitic, as of all other infections of the bones. When they are irregularly distributed in an advanced lesion, it may be very difficult to distinguish, radiographically, luetic osteomyelitis from

CHRONIC OSTEOMYELITIS OF PYOGENIC ORIGIN. In these conditions, as in syphilis, the *x*-ray may show well-marked periostitis, but, as contrasted with syphilis, this may be slight or altogether absent. As in syphilis, there is also seen in many cases extensive areas of osteosclerosis and osteoporosis. The sclerosis may be quite dense, but usually is not as uniformly so as in syphilis, and may indeed present a "mottled" appearance. The involucrum, often seen in chronic pyogenic osteomyelitis, does not occur as such in syphilis and, as compared with the new bone produced in the latter, it usually is thinner, more "porous"—at least in places—and shows in part or throughout some details of bone structure (Fig. 18); its borders, also, are thin and irregular. Extensive destruction or absence of bone cortex is commonly seen in pyogenic osteomyelitis, presenting an image that we do not see in lues. Sequestra, large and small, are common in pyogenic osteomyelitis, unusual and small in syphilis. Large, freely discharging bone sinuses, common in pyogenic osteomyelitis, are very uncommon in syphilis and when a sinus does occur here it is apt to be small and to discharge scantily. Central abscesses, marked by light areas in the picture of chronic osteomyelitis, resemble very closely similar areas produced by small gummata. A sequestrum may be seen in either, but more often in the former. While the zone surrounding a gumma is apt to appear denser than that about a bone abscess, it is best to make the differential diagnosis by other radiographic stigmata. The picture of chronic osteomyelitis ought not to be confused with that of a bone tumor, the features of which are described below.

[4] HOCHSINGER—Die Osteochondritis epiphysaria im Röntgenbilde. *Archiv für Dermatologie und Syphilis*, LVII, 1901, p. 273. Studien über die Hereditäre Syphilis, Zweiter Teil, pp. 254-298.

Figure 1.—Case I. Gumma of Humerus with Pathological Fracture, Mistaken for Sarcoma.
Note marked periosteal thickening, and contrast with picture of periosteal sarcoma, Fig. 11. Note thickening of bone tissue encroaching on medulla; rarefied area surrounded by dense zone, not by thinned-out cortex; absence of expansion. Contrast endosteal sarcomata, Figs. 9 and 10.

Figure 2.—Case II. Gummous Periostitis of Femur, Mistaken for Sarcoma.
Note sharp periosteal shadows, increased density and thickening of bone substance, and absence of shadow of the palpable mass.

Figure 3.—Case III. Syphilitic Osteo-Periostitis of Humerus with Gummata of Soft Parts, Mistaken for Pyogenic Osteomyelitis.
Note smooth, sharp outline of circumferential periostitis along the shaft, and irregular overgrowth of bone substance encroaching on medulla.

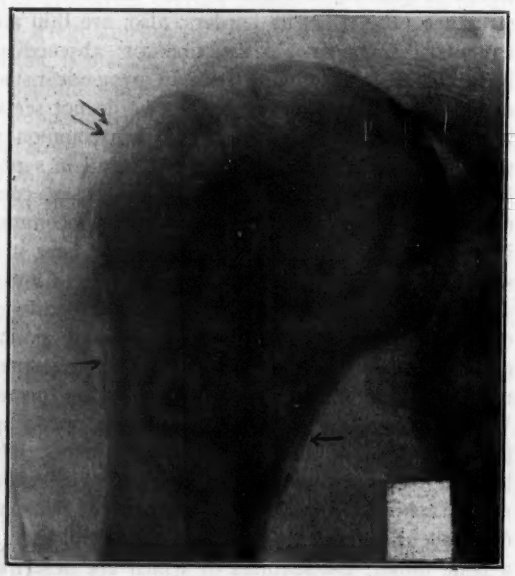

Figure 4.—Case IV. Gumma of Head of Humerus. Early lesion.
Note fine lines of periostitis (marked by single arrows), and beginning rarefaction and necrosis in the bone (marked by double arrows).

Figure 5.—Old Localized Syphilitic Osteo-Periostitis (Gumma) of Tibia.
Note marked bone growth, sclerosis and areas of porosis. Periosteum ossified with cortex.

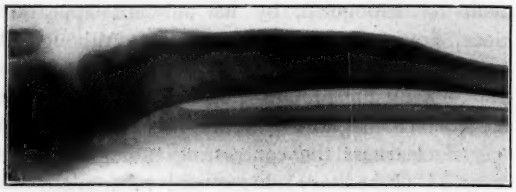

Figure 6.—Old Syphilitic Osteo-Periostitis of Tibia.
Note bone growth, sclerosis, and porotic area below tibial tubercle.

Figure 7.—Syphilis of Lower End of Radius.
Periosteal shadow somewhat resembles that of periosteal sarcoma, but the condition is differentiated by the marked enlargement and increased density of the bone.

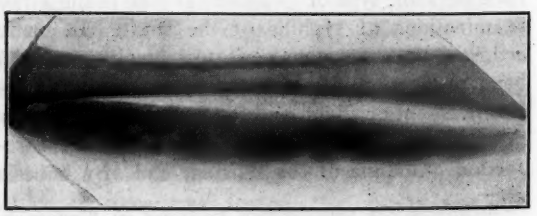

Figure 8.—Chronic Syphilitic Osteomyelitis of Fibula.
Note the dense production of new bone showing very little "bone structure." Contrast with Figure 18 (chronic pyogenic osteomyelitis).

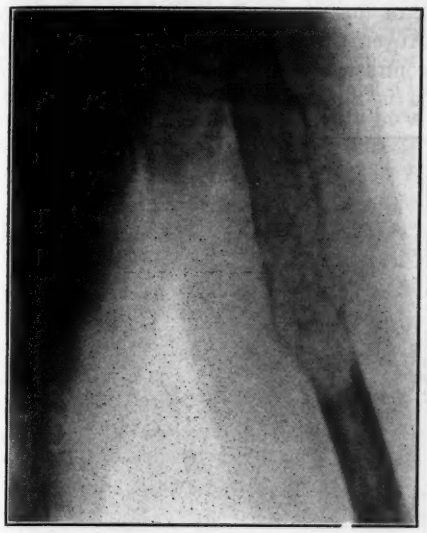

Figure 9.—Extensive Central Sarcoma of Humerus.
Note rarefaction, shell-like thinning out and expansion of the bone, absence of periosteal shadow, absence of reactive zone about the growth, the outlines of which are not as sharp as in Fig. 14 (cyst).

Figure 10. — Central Sarcoma of Radius with almost complete disappearance of bony structure.

Figure 11.—Periosteal Sarcoma of Tibia.
Note blotchy periosteal shadow thinning out in its periphery, also faint shadow of the tumor outline (compare Fig. 2), and absence of change in the bone.

Figure 12.—Carcinoma of Head of Humerus, first form.
Note resemblance to central sarcoma, but absence of expansion.

Figure 13.—Carcinoma of Ulna, second form, Case V.
Note eaten-out, porous, "spongy" appearance of the ulna, absence of bone production and of periosteal reaction. Note also the atrophy of the humerus.

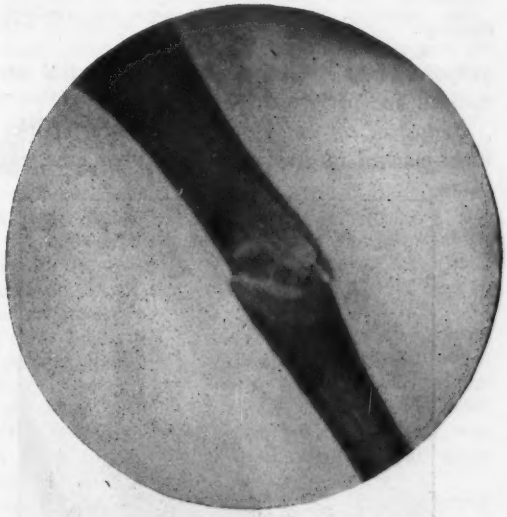

Figure 14.—Cyst of Humerus, with Pathological Fracture.
Note rarefaction in cystic area, thinning and expansion of cortex the same as in central sarcoma. Contrast sharp outline of cyst, and clear shadow of trabeculæ, not seen in sarcoma.

TUBERCULOSIS in its differential radiographic feature has been referred to. It occurs in the diaphysis very rarely and then only as an extension from the epiphysis. Here it causes rarefaction, small areas of necrosis along the articular surface (if extending from the synovia) or within the bone, or extensive destruction of the epiphysis or cartilages. There is little or no periosteal reaction.* Sequestra are usually cortical. In rather advanced cases there is often an extensive bone atrophy (absorption of lime salts) which appears clearly in the plate, and involves neighboring bones. While this extensive bone atrophy is not often seen in pyogenic osteomyelitis, it is not at all pathognomonic of tuberculosis; e. g., in Fig. 13, from a carcinoma of the ulna, the humerus is seen much rarefied. The picture of bone tuberculosis may resemble that of neoplasm, if there is a fairly outlined area of rare-

* Köhler states that massive ossifying periostitis is seen in long-healed bone tuberculosis.

faction (Fig. 17). Physical signs and symptoms will help to differentiate in such a radiographically doubtful case.

SARCOMA of the bones may be divided, for our

Figure 15.—Cyst of Lower End of Tibia.
Note rarefaction, thinning out of cortex, sharp outlines, and trabeculae.

purposes, into its two main types—central or endosteal, and periosteal.

Endosteal sarcoma presents a characteristic picture: marked rarefaction in the tumor area, expan-

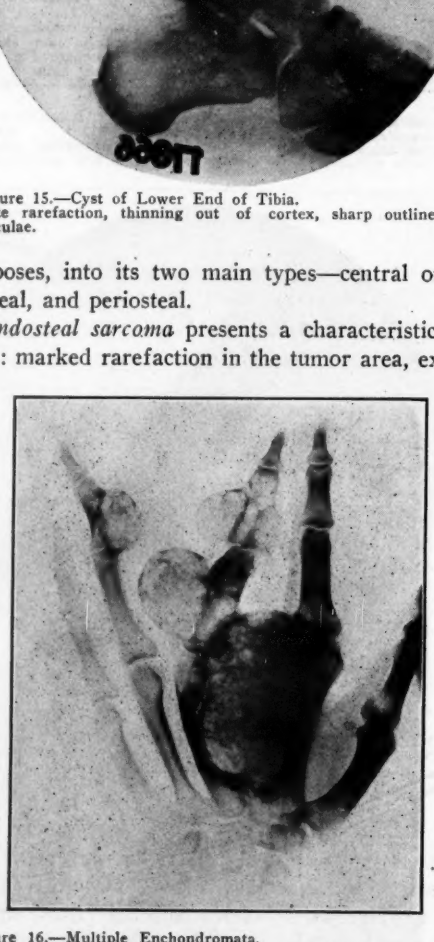

Figure 16.—Multiple Enchondromata.
Note rarefied areas, thinning and expansion of cortex, trabeculation of the tumors, their extension from epiphyseal lines, and the multiplicity of the growths.

sion of, and shell-like thinning out of the cortex. There is no periosteal shadow while the tumor is within the bone (Fig. 9) and there may be none even if it breaks through the bone (Fig. 10). At the site of the tumor all cortical structure may be so destroyed that none appears in the radiogram.

As contrasted with gumma the cortex about a sarcoma is thinned and expanded, not thickened,

Figure 17.—Tuberculosis of Head of Humerus.
Note the cyst-like area of bone absorption, surrounded by an area of bone atrophy. Note also the atrophy in the glenoid, acromion and coracoid. The patient had pus in the tissues about the joint and tuberculous cervical lymph nodes.

there is no dense zone about the light area, and no periosteal deposit.

Periosteal sarcoma presents a periosteal shadow for which the picture of syphilis is often mistaken

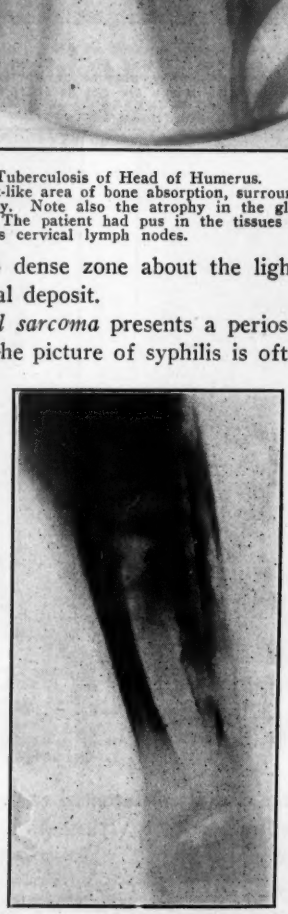

Figure 18.—Chronic Pyogenic Osteomyelitis of Ulna.
Note the extensive involucrum, showing considerable bone structure, formed in an effort to reproduce the entire shaft. The diseased shaft shows necrosis, absorption, fracture, but no bone production within itself and no periostitis. Compare Figure 8.

by the unwary, as in Cases I and II. The periosteal image in syphilis is, however, sharply outlined

and may be quite dense, while that in periosteal sarcoma is irregular and thins out in its periphery where it is lost in the surrounding tumor area, which also casts a shadow, however faint (Fig. 11. Contrast periosteal gumma, Fig. 2, with no shadow of the mass). The shadow in sarcoma is often blotchy, wavy or fringe-like and, instead of hugging the bone, as in syphilis, it may appear to radiate from it like miniature swirls in a sandstorm. One may, however, sometimes see a fringe-like periosteal shadow in syphilis, as in Fig. 7, but it can be distinguished from that of periosteal sarcoma by the accompanying changes in the appearance of the bone itself. In periosteal sarcoma the shadow of the bone may appear normal, or merely darkened by the overlying tumor. If the growth invades the corticalis, its shadow is correspondingly intensified and widened. Chondrification or ossification in a periosteal sarcoma appears in the picture according to its extent.

MYELOMA presents the same *x*-ray appearance as endosteal sarcoma, with which it is often grouped, clinically and pathologically. It has a well-known tendency to multiplicity and a predilection for the ends of the long bones, the ribs and the cranial diploë.

CARCINOMA, in my experience, appears in the bones, radiographically at least, in two forms. In one the picture is much like that of a central sarcoma, viz., rarefied tumor area and thinning of the surrounding bone, with this difference, however, that in carcinoma there is absence of the expansion of the bone shell so conspicuous in sarcoma (Fig. 12).

In the second form the radiogram shows the bone irregularly eaten away, superficially as well as in the depth, and what bone structure is left in the tumor area appears spongy, porous, eroded (Fig. 13). In carcinoma one never sees reactive bone production.

BONE CYSTS, of various types histologically, present an *x*-ray picture much like that of endosteal sarcoma: translucency; thinning and expansion of the cortex. As compared with sarcoma, however, the bony wall of the cyst is sharply outlined (a diagnostic feature which, of course, is lost if the picture is blurred by a movement of the patient during exposure); and the light area is often traversed by the shadows of trabeculæ (Figs. 14 and 15). Trabeculæ are sometimes seen in central sarcomata, but they do not appear as sharp or as complete as in cysts. The wall of the bone cyst is often the seat of a pathological fracture, but the radiogram never shows it extensively absorbed or broken through as in sarcoma (Fig. 10).

ENCHONDROMA provides an *x*-ray picture like that of central sarcoma and that of cyst: translucent area, thinning and expansion of cortex. The light area is apt to appear distinctly lobulated (trabeculated); its border is fairly sharp; it extends from the line of the epiphyseal cartilage; and in many cases it will be found in two or more bones (Fig. 16.)

ILLUSTRATIVE CASES.

CASE I.—J. G., a chauffeur, about 30 years old, suffered a fracture of the mid-shaft of his right humerus while shifting gears in driving an automobile. There were distinct crepitus and slight thickening at the site of the pathological fracture, and a clinical diagnosis of sarcoma was made by several surgeons. They were confirmed in their opinion by the *x*-ray picture (Fig. 1), on which an experienced radiographist also reported unequivocally "sarcoma"; and the patient was prepared for operation. After scrutinizing the picture, and before examining the patient, I insisted that the lesion was not a sarcoma, but a gumma.

The radiogram presents the characteristic periostitis of bone syphilis and the also characteristic bone production and thickening of the bone substance. As opposed to periosteal sarcoma: the periosteal shadow is heavy, distinctly outlined, hugs the bone and does not fade off in the periphery; there is no shadow of the large tumor mass that so extensive a periosteal neoplasm would have developed; there is a translucent area within the bone and a pathological fracture through it, neither of which is found in periosteal sarcoma. As opposed to central sarcoma: the translucent area is surrounded by a much thickened, not a thinned corticalis; below the light area the medulla appears almost obliterated by the growth of new bone; there is no bone expansion; there is a periosteal reaction not seen in endosteal sarcoma.

A clear history of syphilis was then elicited from the patient, and his blood yielded a positive Wassermann reaction. After two injections of salvarsan the bone fragments united in four weeks and, specific treatment being continued, the patient was soon restored to health and activity with arms sound and whole.

CASE II.—G. M., male, aged 50, was suffering with a painful, slowly growing, fist-sized, fusiform, smooth, hard, not tender mass, firmly attached to the upper third of the femur, anteriorly. There was no history of syphilis; Wassermann reaction negative. A clinically justifiable diagnosis of osteosarcoma was made, and an experienced radiographist reported his finding (Fig. 2) "periosteal sarcoma." Here, again, I insisted that the radiogram was typically that of a luetic process, in spite of the negative blood finding, and that the large mass was therefore a gumma. The picture shows characteristic periosteal reaction and dense shadow of bone production. A periosteal neoplasm causing a swelling of such size would have cast some shadow on the plate, and the periosteal outline would have presented a different appearance.

After intravenous salvarsan injection the Was-

sermann reaction was again negative. The patient continued to suffer considerable pain and to exhibit a subfebrile temperature course, and he developed a leucocytosis of 18,000—for all of which reasons I thought there was some breaking down or suppuration and decided to open through the mass. The operation revealed periosteum of half-inch thickness and breaking-down of the gumma subperiosteally. The bone beneath was trephined over an area of two inches and the medulla was found normal. A section from the periosteum, and the grumous subperiosteal material were reported "syphilitic inflammation." The drainage relieved the man's pain, and under continued specific treatment he has been making a good recovery.

CASE III.—A boy of 10 suffered gradually increasing pain in the left arm, which was somewhat swollen and slightly tender, and showed at its upper end, externally and internally respectively, a rounded, raised, reddened area discharging thin pus through a sinus. Two surgeons had diagnosed osteomyelitis and advised operation. The two discharging swellings appeared to me to be gummata and suggested to me that the underlying bone lesion was syphilitic. The *x*-ray picture (Fig. 3), which a very competent radiographist reported "osteomyelitis," made me sure of my clinical diagnosis, in spite of a negative Wassermann reaction and absence of syphilitic history. The picture shows beautifully the sharply outlined tracings of periosteum circumferentially thickened along the diaphysis. The somewhat scalloped, irregular border between the medulla and the bone proper, which had been interpreted as indicating myelitis, is due to irregular encroachment on the medulla by the process in the compact and spongy portions. Under specific treatment the boy recovered without other operation than incision and drainage of the gummata.

CASE IV.—J. J., aged 32, was referred to me several years ago because of severe pain and disability in his left shoulder. I was one of several surgeons who incorrectly diagnosed his ailment, which was variously considered periarthritis, subacromial bursitis, tuberculosis and sarcoma. Several months after I saw the patient a small section removed from the head of the humerus was reported "chronic inflammation," and eventually the disease was proved to be syphilitic. If today the radiograph (Fig. 4) taken when I first saw this man, were submitted to me, I should recognize in the fine tracings of periostitis about the neck of the humerus the tell-tales of syphilis, and in the beginning rarefaction and erosion in the region of the tuberosities, associated with the periostitis, the imprint of a gumma.

In CASE V also I was one of several surgeons who failed to make a correct clinical diagnosis. The patient was an elderly, emaciated woman admitted to the second surgical service of Mount Sinai Hospital with gradually developing pain in the right forearm, the ulna aspect of the upper end of which was swollen, edematous and tender; the elbow joint was normal. The condition was variously diagnosed chronic osteomyelitis, tuberculosis, syphilis and sarcoma of the ulna. The radiogram (Fig. 13) was also variously interpreted. A section of the bone and soft parts which I curetted from the forearm through a small incision was reported carcinoma. Subsequent observations indicated that the woman probably had a primary growth in the stomach.

CASE VI.—D. S., painter, aged 40, presented himself seven years ago in my then out-patient surgical department of Mount Sinai Hospital with a fracture of the mid-shaft of the right humerus, acquired in falling from a scaffold. No radiograph was made, for reduction was easily maintained and the patient made a very satisfactory recovery. A year later he returned to me with the report that a few hours before he had been jostled in a car and felt the right arm break again. I found it broken, indeed, and made a diagnosis of sarcoma on the history. The *x*-ray plate showed an extensive central sarcoma involving the greater part of the humeral diaphysis, as indicated in Fig. 9.

In the hospital, February, 1907, Dr. Lilienthal removed the entire growth, leaving only the upper and lower ends of the bone. After ultimate healing, a metal brace was provided for the arm, which allowed the patient to make good use of his extremity. After six years without any recurrence of the growth (round-cell sarcoma), the patient was re-admitted to the hospital in November, 1912, and I introduced into his arm a long graft taken from his left tibia, bridging the large space between the upper and lower fragments of humerus. Unfortunately, the wound became infected (perhaps because a large number of visitors crowded about the operating table) and the graft had to be removed later.

This case is referred to, not because it represents a mistake in diagnosis, but because it illustrates: first, a rather rare condition—sarcoma developing at the site of a fracture; and second, the excellent result of a conservative operation (resection) for bone sarcoma, as compared with amputation. It is to be regretted that it does not also illustrate the good result in an homologous grafting to replace a large bone defect.

30 WEST 92ND STREET.

PYELITIS IN INFANCY.

The recognition of pyelitis in childhood is usually easy, and yet it is overlooked again and again simply because the possibility of its occurrence is forgotten and the urine of an infant is seldom examined. Unrecognized acute pyelitis in infancy gives rise to prolonged severe fever, with profound constitutional disturbance, which may be fatal. Recognized and treated appropriately, it often subsides in a few days, and even if symptoms persist for a time they quickly become less severe, and generally soon yield to treatment.—GEO. F. STILL in *Pediatrics*.

ON THE TREATMENT OF EPITHELIOMA.

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It is necessary to understand that epithelioma and carcinoma are identical affections, only in a different degree of development. Ziegler[1] stated that the cancers which develop from the surface epithelium were formerly called cancroids and epitheliomata, in contrast with other cancers which were supposed to grow from the connective tissue. The difference is in the degree. The epithelioma remains for some time as a simple benign affection, but after a certain time it will begin to ulcerate and will show its cancerous destructiveness, and also its infective nature. Epithelioma remains such so long as the epithelial cells in their enormous growth are encapsuled and opposed by the resistent connective tissues of the derma.

When the cancerous cells make their way into the deep layers of the skin, which do not possess a solid and compact stroma like the upper portions of the derma, then the growth begins to appear bulky and nodular and it is called a carcinoma. The more the tissues lack in resistance the faster and larger the carcinoma grows. "Benign epithelioma" does not exist; it is a misleading appellative of an innocent looking growth, which in time will show its malignant and destructive characters. It is, therefore, necessary to destroy the first appearance of carcinoma, which we call carcinomatous initial lesion, or epithelioma.

On the face and on the hands and sometimes on the trunk we see before the formation of an epithelioma, or at the same time, reddish or yellowish or brownish pigmented spots, hard, covered with scales, which usually are accompanied with unbearable itching sensation. These patches have been called by Hartzell precancerous keratosis. These keratotic patches are very often seen in farmers or farm hands; they remain for some time unchanged, finally some are changed into epithelioma. A superficial growth, hard, brownish in color, of the size of a split-pea to that of a dime or more, uneven, superficially ulcerated, covered at times with small crusts, at times dry, gradually begins to be bulky in the edges, hard and, when neglected, it is changed into carcinoma.

By scraping the keratotic, or Xerodermic patches I have found small round spores containing granular substances. These spores do not take stain, and are soon destroyed, or rendered invisible by the Canada balsam. They can be seen only with the India ink method, or by using the diaphragm of the microscope nearly closed. There observations were communicated at the meeting of the International Congress of Medicine in Lisbon and were published in the acts of that Congress. If the presence of the spores could be confined, precancerous keratosis, epithelioma and carcinoma would be the production of moulds, taken from the manure or from the mud. Epithelioma and carcinoma then would have some relation to blasto—or oidiomycosis.

The purpose of this article, however, is not to deal with the etiology, but with the treatment of epithelioma.

Starting from the base that epithelioma is a local affection, which remains on the locality for years without producing any apparent infection, the best treatment is the local treatment, the destruction of the growth by chemo-therapeutic means. Arsenic has been employed for a long time. Hebra used with good results the Cosme paste, which is made up with arsenic and cinnabar, in cases of lupus and of flat skin cancer. Hebra pointed out the elective action of arsenic on the cancer tissues. But on account of the pain produced by the application, and of the resulting inflammation, the method was abandoned. It is only used by some "cancer doctors," and at times with good results.

The method of Czerny and Trunecek, which consisted in painting the ulcerated epithelioma with an alcoholic solution of arsenic,

Arsenic Acid	gmm.	1,00.
Alcohol		75
Aq. Destill.		aa.

for the same reason did not stand the clinical test. Recently Dr. Zeller in Weilheim has treated a series of cancers with a modification of arsenic paste, and by the internal use of silicic acid. He has reported many cases of skin cancers, some of the breast, and of the uterus in the vaginal portion, successfully cured with this method.

The use of arsenic internally or subcutaneously has been greatly recommended in the treatment of cancer. In the form of cacodylate of sodium it has been used hypodermatically in inoperable cases, and we agree with Czerny that it has increased the appetite and has helped in the increase of the blood corpuscles. Salvarsan intravenously has been used in cases of carcinoma without any results. It has given some benefit in round and spindle cell sarcoma, and in some kinds of lymphoma. Czerny[2] refers to a correspondence with Excellence Ehrlich, in which he advises the use of neo-salvarsan for local applications on ulcerated carcinoma. So far not

much has been done in this direction and we have no positive information of results obtained.

Physico-therapeutic means have been and are still extensively used in the treatment of cancer. Since Schwarz and Senn have obtained results with the *x*-ray in cutaneous cancer, it has been so extensively applied that nearly every doctor has to-day an *x*-ray apparatus. I have used the *x*-ray in carcinoma quite extensively, but to-day I very seldom use it for therapeutic purpose.

The action of the *x*-ray is a radio-active one, and to this have been referred the effects of radium actinium, mesothor and thor X. The rays act some on the surface and some on the deep structures. By means of screens the superficial rays can be eliminated and penetration made to reach the deep-seated affected tissues. The young fast-growing cells are disintegrated, dissolved and killed by the rays. It is also possible that under their influence some ferments are formed, which may help the development of healthy tissues and that the not yet discovered germs of cancer may be stopped in their progress. In my experience cases of carcinoma have remarkably improved under the action of the *x*-rays. But at a certain point the improvement remains for some time at a standstill, then there is a turn for the worse. In some cases the rays have hastened metastases, the internal organs were early affected.

Excision seems to be the best way to deal with cancer, but it is not sure, nor is it applicable in all cases. Nor does operation save from a relapse, which unfortunately after the bloody operation is more frequent. This observation had not escaped the attention of the French surgeons, who expressed the opinion that at the edge of the cut, the knife left a great quantity of germs, which later on cause the relapse. Hence the resulting wound after the operation is washed with a solution of bichloride of mercury, or with chloride of zinc, or burned with the actual cautery or with caustics as recommended by Landolfi, Canquoin and Maisonneuve.

Fulguration, which was at first used by Strebel and Suchier in lupus and in ulcus rodens has been employed by de Keating-Hart for the purpose of destroying the remaining infectious cells after removing a cancerous growth. I saw this method employed in several cases by Bainbridge, in the Skin and Cancer Hospital in New York, at the time of the Clinical Congress of Surgeons of North America, November, 1912. Bainbridge uses the Gaffe high frequency current apparatus, which gives a flash of sparks 12 to 15 inches long. He thinks that the fulguration has no destructive action on the tissues, like the thermo-cautery, but only stimulates the healthy tissues to get rid of the diseased and infectious cancerous cells. He showed some cases operated upon for cancer of the neck, of the lower lip, of the tongue, three, two, and one years since the operation, with healthy-looking scars. A full report was given by Bainbridge[4] on the results obtained with this method and with the Thermo-radio-therapy, in the Medical Record.

Czerny objects to the de Keating-Hart fulguration method as being too painful, and because it has to be used always under general anesthesia. For this reason he recommends the use of short sparks, which are not so painful, can be employed without anesthetic, and give the same result. Their action resembles somewhat that of the ultra-violet rays, viz., to stimulate the leucocytes to accomplish their phagocytic function. It causes an abundant lymphorrhea and the wound after the fulguration discharges a great quantity of serum.

The application of carbon dioxide snow has been used in epithelioma. The destructive action of cold was at first proposed by Pusey in the treatment of lupus and of some benign forms of cutaneous growths, as nevi, etc. We have not sufficient information in the use of excessive cold in the treatment of epithelioma.

In my practice every year comes in some epithelioma and carcinoma at different degrees of development. To operate these cases, to remove a large slice of skin and muscles of the face, for epithelioma the size of a dime, seems to me to be not only too mutilating, but also to savor of tutiorism.

When we consider that epithelioma is a local affection, and remains local for a long time, that in all possibilities it is produced by the presence of a *mould* which stimulates the proliferation of the epithelial cells, which growing downward infiltrate the connective tissues and lymph spaces, forming the characteristic nests, we cannot refuse the idea to destroy it in the locality. Caustics have been employed in immense quantity,—caustic potash, chloride of zinc, acid nitrate of mercury as used by Sherwell, antimony, arsenic, resorcin,—but the caustics destroy the diseased tissues together with the good tissues. The caustic does not destroy all the cells in the area of the epithelioma and quite often in the same scar a new epithelioma is formed.

In my opinion we should find a remedy that possesses a parasiticide action. The remedy must have the property of penetrating into the tissue to a certain extent. It must exercise a cornifying action on the keratin of the epithelial cells, stopping their vitality and their growth. I published

some observations[5] in 1899 on results obtained by the application of formaldehyde in epithelioma and in carcinoma. Formaldehyde has powerful parasiticide properties as pointed out by Locu, 1886, and later by Aronson, Berlioz and Trillat. When formaldehyde gas or solution is sent on cultures of bacteria their growth is arrested. The penetrating power of formaldehyde is remarkable. The fact that it can preserve cadavers for a long time shows that it penetrates the whole substance of the corpse and kills all bacteria producing putrefaction.

The action of formaldehyde at its normal strength is that of a powerful parasiticide, the epithelial cells are made dry, lose their keratine and fall off, necrotised, in a sort of yellowish, thick mass. Normal tissues are not affected severely by formaldehyde, and after the necrotic mass has sloughed off the separation of the tissues is complete and scarcely any scar remains.

Formaldehyde is diffusible and even in mild solution for sterilizing purpose it causes dermatitis, which in some cases is very stubborn and has some resemblance to an x-ray dermatitis.

From 1899 I continued the treatment of epithelioma with local applications of formalin, and obtained more than satisfactory results. When formalin was not so efficient, then it was helped with a few applications of x-ray.

The use of pure lysol on lupus erythematodes, lupus vulgaris, and tuberculosis verrucosa cutis, showed that its beneficial action was due to the coagulation of the serum in the connective tissue elements and in the plasma cells which form the body of the tubercular tissues, and are found also around the cancerous growths. This condition produces a degeneration or, better, a necrosis of those collagenous tissues, they turn yellowish in color, adherent to the ulcerated surface, and gradually they are sloughed off. This prompted the idea to mix the two remedies together and by this means accomplish the treatment of epithelioma,—formalin to destroy the possible parasitic elements and disorganize the epithelial infiltrating cells; and lysol to affect the hypertrophic connective tissues surrounding the epithelial cells. A mixture of equal parts of formaldehyde and lysol was used with satisfactory results. In the application of this mixture blood and serum oozed from the wounded surface, which was disconcerting to the operator. The application of perchloride of iron to stop the bleeding prompted me to mix it with the formalin and lysol.

The mixture has to be prepared at the moment of using:

Formaldehyde	2 parts
Lysol	2 parts
Ferric perchlorid	1 part

This forms a thick greenish mixture which can be applied on a piece of cotton, or on cotton twisted on an applicator. It is necessary to be careful not to splash the fluid on the healthy skin. Also, when operating near the eyes, nose or mouth pads of cotton or gauze have to be used in order to prevent the fumes of formaldehyde from irritating the mucous membranes. When the mixture is allowed to remain a few hours in an open glass, it turns to a dark brown fluid, and loses its efficacy.

When operating, the surface of the epithelioma of the skin, or mucous membranes, is thoroughly washed with green soap and water. All crusts and secretions are completely removed. The application of ethyl chloride has to be avoided, because freezing the serum makes a hard, friable mass, and it is difficult to know when to stop scraping. It is better to apply a 5 per cent solution of cocain. The epithelioma so prepared is scraped off with a sharp curette, until when passing the finger on the wound it is felt perfectly smooth. In scraping, care has to be given to the edges of the growth to remove every hard particle. If the curette cannot remove all, then the scissors will finish the work. When the surface is so prepared, another application of cotton saturated with cocain solution is applied for two or three minutes, then the surface is dried and a tampon saturated with the mixture of formalin, lysol and perchloride of iron is applied. The time to keep this application on varies with the depth and extent of the epithelioma. Usually five minutes is sufficient to destroy all the infiltration which still remains. The surface is then washed with ordinary alcohol, which removes the mixture and relieves the burning sensation. On the following day the surface is covered with abundant yellowish necrotic mass. This remains from 8 to 14 days, sloughing off gradually from the periphery towards the center, while the surface is healing up. There is no formation of pus, but the secretion is due to serum mixed with detritus of the necrotic tissues.

Sometimes, for precaution, the application of the formaldehyde mixture is repeated, after eight or ten days, until the surface has perfectly healed up.

For dressing the resulting wound a salve of

Ichthyol	1 oz.
Unguent Diachylon Hebrae	1 oz.

is used. This is spread on a piece of gauze and applied, covering the surface perfectly. This plaster covers and protects the wound, favors the sloughing

of the necrotised elements, and presents the formation of crusts.

In two cases of ulcus rodens of the forehead, in one with affected bone, by repeated applications results were obtained which could scarcely be expected. When, however, the carcinoma has affected the loose tissues, subcutaneous tissues, with involvement of the lymphatic glands, then the case cannot be helped by any other means than a radical surgical operation, which also may not be beneficial.

It is my opinion that the application of the perchloride of iron to the scraped surface, coagulating the blood and the lymph, blocks the vessels and interferes with the penetration of the cancerous cells, and prevents the infection of the glands. If the cancerous elements should not have been completely destroyed, after a few weeks new little reddish nodules come up again. Another treatment will completely destroy them. More than satisfactory results have been obtained in ulcus rodens of the forehead, of the temporal regions, epithelioma of the cheeks, nose, lips on the edge of the mouth and near the gums, of the curiculæ, of the neck, of the back of the hands and of other parts of the body.

I also tried solid formaldehyde 95 per cent in a paste, but the results were not so good as were obtained with the freshly prepared liquid. This mixture has given good results in most of my cases of epithelioma and incipient cutaneous carcinoma. Its effects are equal, if not superior, to other physical expensive means. It is very cheap, very simple and very effective.

[1] Ziegler—General Pathology. 1899, p. 383.

[2] Zeller. Behandlung und Heilung von Krebskranken durch innerlich und ausserlich medicamentöse Mittel. Münch. Med. Wochenschrift. No. 34, 35. Aug. 20 and 27, 1912.

[3] Czerny Vincenz—Uber die nicht operative Behandlung der Geschwülste. Münch. Med. Woch. No. 41, Oct. 8, 1912.

[4] Bainbridge, W. S. The de Keating-Hart Method of fulguration. *Med. Record*, July 6 and 20, 1912.

[5] Ravogli. Nature and Treatment of Cutaneous Cancer. *Journ. A. M. A.*, Nov. 18, 1899.

LUMBAR PUNCTURE.

Since in children the spinous processes of the lumbar vertebra are short and extend nearly directly backward, the puncture is made most readily in the *median* line, close to the under border of the spinous process of the upper vertebra of the chosen space. In adults, because of the anatomical differences in the spine, and because of the interspinous ligament, there is more room for approach if puncture is made to one side of the median line, and at a level with the lower part of the spinous process of the vertebra next above the space used. The needle, however, should be pointed toward the median line.— G. R. PISEK, in *The Post-Graduate*

LIGATION IN HYPERTHYROIDISM.*

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In the literature regarding the survey of the thyroid gland, I have been unable to find a satisfactory description of the technic of ligating the superior and inferior thyroid vessels with their accompanying venous and lymphatic structures.

The benefit of ligation of the thyroid vessels and partial thyroidectomy in disturbance of the thyroid gland, contrary to the experimental work of some pathologists and internists, has been so marked that from a symptomatic and clinical standpoint, little more can be wished for.

Twenty-six cases have been operated upon by me by this method during 1911 and 1912 without a fatality. The condition of the patients varied from grave hyperthyroidism with the symptom-complex indicating Basedow's disease, to minor types of rapid heart action and nervous disturbance.

The type of thyroidism in which the indication is for ligation of the blood, lymphatic and nerve supply, is to be found in the very severe form of Basedow's disease and in the beginning types in which thyroidectomy would be too severe and unnecessary a procedure, carrying with it some mortality and not offering more relief than simple ligation. Those of moderate severity may best be handled with a primary partial thyroidectomy.

In our cases, an analysis may be of some interest. Six were of the very severe form, suffering from exophthalmos, much loss of weight, tremor and exceedingly rapid pulse; ligation was a preliminary step to the thyroidectomy, which was performed, except in one case, at periods varying from two to six weeks following ligation, with a single fatality.

The two most striking examples of benefit from thyroid ligation in hyperthyroidism were in the following cases:

CASE I—H. S. W., a farmer, who had never been ill since childhood, except in August, 1910, contracted a severe typhoid and was confined to his bed eleven weeks, six of which he was very delirious and part of the time unable to recognize anyone. In January, 1911, he had regained his health and his usual weight (about one hundred and fifty pounds). The March following, he began to feel nervous, could not sleep, appetite was poor, and he complained of much weakness and was losing weight. Early in May, when I first saw him, he

* Read before the Academy of Toledo and Lucas County, January, 1912.

weighed one hundred pounds, having lost fifty pounds in two months.

A diagnosis of tuberculosis had been previously made. To me, no evidence of this existed; his condition was one of marked Basedow's disease with cachexia, loss of weight, fine tremor, pulse 160, exophthalmos. He was sent to the hospital for further study—blood examination, tuberculin test and other laboratory procedures to fix the diagnosis. During the observation week he lost four pounds more. Ligation was performed. In the two weeks following, his general condition was much improved—sleeping well, appetite improved, nervousness greatly decreased. On May 17th, right thyroidectomy was safely done and in four weeks the patient left the hospital weighing one hundred and twenty-six pounds. At the end of the twelfth week, he had advanced to one hundred forty-two, was eating and enjoying life as a convalescent. The nervousness had not entirely disappeared and the pulse ran from 90 to 119, according to the degree of physical and psychical disturbance.

Fig. 1—Longitudinal incision extending along the anterior border of the sterno-mastoid muscle from A to B.

CASE II—M. J. B., aged 43. Family history good with the exception of some family heart trouble and a case of simple goiter in the mother's family. The patient was a farmer who worked hard all his life and was of temperate habits. He had pneumonia when a young man. Always suffered from slight attacks of rheumatism. In 1907, he began to complain of languor. Opinion passed of heart trouble. In 1909, patient went West, where he still engaged in farming. He had a rapacious appetite and ate promiscuously. In the winter of the same year, he exhibited symptoms of delirium, becoming excessively obstinate and unmanageable at times, with a high temperature and extreme nervousness. Continued to maintain an abnormal appetite and gradually decreased in weight, until he became weak and emaciated. In May, 1909, he weighed 165 pounds and in September of the same year, 144 pounds. In February, 1910, patient had become excessively weak, with a daily evening temperature of 101°. After a month's complete rest, he regained a little strength, the fever subsided and he resumed work. Shortly after this he complained of a sense of tightness at his collar band.

Tuberculin test was negative; patient was performing manual labor, and had regular attacks of extreme weakness and dizziness. About this time, he discontinued his work, being in a condition of excessive weakness, which was followed by ten days of delirium, during which time, he was very irrational. He was put to bed, complaining of an intense "creepy" sensation all over his body accompanied by chills. In a few days, he became blind and deaf, and developed a delirium, which gradually increased, restraint in bed was necessary.

Following this, he became comatose. Ligation of both superior thyroid vessels, without removing him from bed. Remained in comatose condition for three days. Food administered by stomach tube and enteroclysis. On the morning of the fourth day after operation, consciousness began to appear. Recognized his family and swallowed naturally a small amount of liquid. From this time on, improvement was gradual, until the end of eight weeks, patient was able to be out of bed. Steadily improved during the following summer, although not able to work. Looks well. Heart action, when inactive, nearly normal, has regained his normal weight, complains of nervousness and does not want to leave home surroundings. Has refused lobectomy, which has been advised to complete cure.

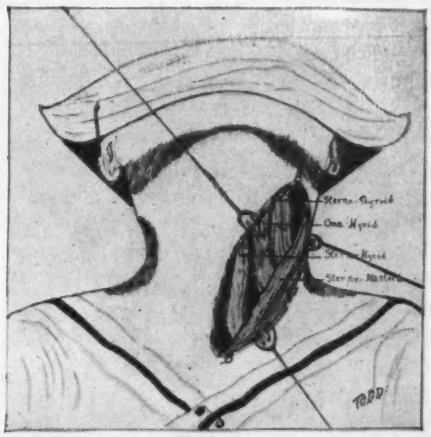

Fig. 2—Showing skin incision and separation of edges disclosing exteriorly the sterno-mastoid muscle, and interiorly the sterno-hyoid, omo-hyoid and sterno-thyroid muscles.

Twenty cases were of the mild form with slight tremor, tachycardia and general nervousness without exophthalmos and loss of weight, the thyroid gland being slightly enlarged, soft and doughy to the touch, but with marked pulsation of the carotids. These cases had been previously treated by rest tonics and with different forms of medication, which are so frequently used in these cases. The results being beneficial as long as the treatment was continued—with recurrence as soon as the patient resumed the usual round of life.

Ligation had effected a permanent cure to a marked degree in nearly every case, as has been proven by permitting them to indulge in their usual life without the distress from rapid hearts and nervousness, which had been their experience.

I am convinced from experience, that a great many women, who suffer from so-called neurasthenia are, in fact, cases of thyroid poisoning and that the simple operation of ligating the blood supply as outlined here, will effect a cure.

To successfully ligate the thyroid vessels, a knowledge of the anatomy of the thyroid gland, with its blood supply and muscular covering, is necessary. In operations upon the thyroid gland, injury to the venous supply is even more dangerous than to the arterial. During ligation, unless proper precaution is taken, a part of the venous plexus may be injured, as these vessels, branches of the superior and inferior thyroid veins, ramify under the capsule in many directions and are easily punctured with the ligating needle, giving the surgeon considerable annoyance in checking hemorrhage and adding to the gravity of the operation.

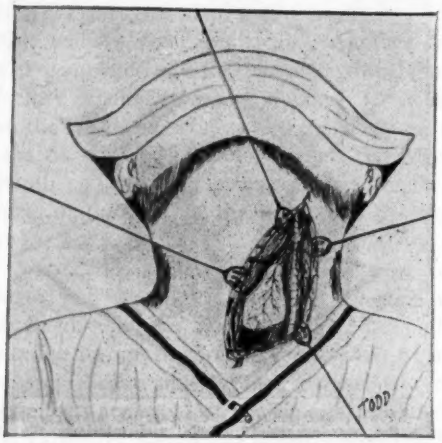

Fig. 3—Showing retraction of the muscles; and exposing the exterior-posterior margin of the thyroid gland with superior and inferior thyroid vessels.

The superior thyroid artery is a branch of the external carotid and leaves this vessel just above the carotid bifurcation. It is located beneath the anterior belly of the omo-hyoid muscle, internal to the carotid vessels and to the sterno-cleido-mastoid muscle. It is easily ligated, owing to its superficiality.

The inferior thyroid is much deeper in the neck and is a branch of the thyroid axis. This vessel, at times, branches before entering the gland, with the recurrent laryngeal nerve running between its branches. The inferior thyroid enters the gland from the side and not from below, thus often escaping ligation when an attempt has been made to throw a ligature around the lower extremity of the thyroid gland. It is sometimes found beneath the capsule running on the posterior surface, as a single branch. It is not as easily ligated as the superior thyroid vessel and for this reason it may at times be advisable to ligate both superior thyroid arteries, rather than encounter the difficulties of ligating the inferior artery.

Following is the technic of ligating the thyroid vessels as shown by the accompanying illustrations: A skin incision is made an inch and a half in length, along the anterior border of the sterno-cleido-mastoid muscle, the upper extremity of the incision being the lower border of the cricoid cartilage. This incision is deepened through the deep fascia and the platismamyoides until the inner surface of the sterno-cleido-mastoid is brought into view along the outer border of the incision. By dissecting the superficial tissues from the muscles, from the inner side of the incision and retraction of the tissue, the edge of the sterno-thyroid comes into view at the upper angle of the incision. Just to the inner side of this muscle, we find the anterior belly of the omohyoid, while inside of this muscle is located the sterno-thyroid (fig. 1). With a few strokes of the knife, the connective tissues holding the omohyoid, is separated. These muscles are retracted, the sterno-hyoid to the inside, the omohyoid and the sterno-cleido-mastoid to the outside. By blunt dissection, the anterior surface of the thyroid gland is brought into full view by separating the muscles from its capsule (fig. 2). This dissection is continued downward and backward, under the sterno-mastoid muscle and over the surface of the gland, until the carotid vessel in the depth of the wound, is in full view.

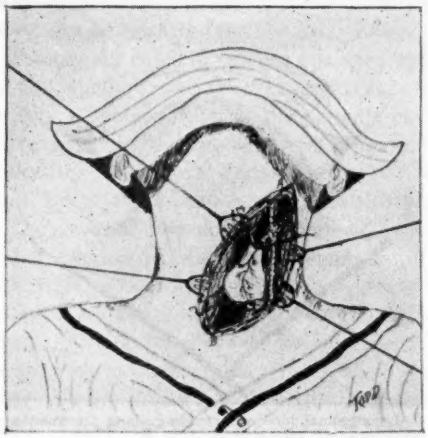

Fig. 4.—Showing the superior and inferior thyroid vessels ligated, including a portion of the gland tissue in the ligature.

The thyroid gland, covered with its uninjured capsule, lies in the field before one. With slight traction upon the gland, the superior thyroid artery is to be seen at the upper angle of the wound, leaving the carotid and entering the gland at its upper extremity, and the inferior vessel, deep in the lower angle, entering the gland on the posterior surface, about one-third of an inch distance upward from its lower extremity (fig. 3).

A full curved round needle, threaded with number two chromatized catgut or iron-dyed silk, is now passed, with the arteries in full view, being certain to include sufficient tissue, whereby the lymphatic structures and nerve supply of the gland may be included with the artery. The direction of the needle being from below, upward and at right angles to the carotid vessel.

316 COLTON BUILDING.

DISEASES OF JOINTS AND BONE MARROW.

THE ANATOMY, PHYSIOLOGY AND PATHOLOGY OF BONES AND JOINTS, GENERAL CONSIDERATIONS.

LEONARD W. ELY, M.D.,
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ACUTE INFECTIOUS ARTHRITIS.

The chief infective agents are ordinary pus cocci, the gonococcus, the typhoid bacillus and the pneumococcus. The streptococcus (or diplococcus) rheumaticus of Poynton and Paine will perhaps secure a permanent place as a causative agent. We find the disease occurring as the result of punctured wounds, compound dislocations, and compound intra-articular fractures, infection of tuberculous sinuses, as an extension of suppurative processes from the shafts by operation or spontaneously, etc. It may be a manifestation of a general pyaemia, and it may be a metastasis from some unknown source. It sometimes follows the acute infectious diseases, particularly scarlatina, pneumonia and typhoid. In the last two the pneumococcus or typhoid bacillus may be present alone, or with the ordinary pus cocci. The same may be said of the gonococcus. According to the modern view, acute articular rheumatism is really an acute infectious arthritis.

Taken in connection with the blood-forming function of the marrow, it is a most significant fact that the infectious diseases characterized by leucocytosis are those that an arthritis follows. Typhoid fever has a leucopenia in the early stages, but a leucocytosis in the late stages, and it is in the late stages that arthritis occurs. Pneumonia may or may not have a leucocytosis according to circumstances. Mumps and malaria, as far as I know, are never complicated by arthritis.

In certain instances infectious arthritis is thought to be due to toxines rather than to bacteria themselves, but the possibility of the presence of the bacteria in the bone marrow alone must not be overlooked.

Morbid Anatomy. The disease may be confined to the synovia, or it may also involve the marrow. The synovia presents the signs of an acute inflammation—engorgement, redness, thickening, villous proliferation, etc. An exudate is quickly poured out into the joint cavity, serous, fibrinous, or purulent, as the case may be.

Gonococcal and typhoid infections usually remain confined to the synovia. Pneumococcus, streptococcus, and staphylococcus infections generally spread quickly to the marrow also, or they may first involve the marrow and then spread to the synovia. The marrow of the bone ends may be involved either primarily or secondarily to the inflammation of the synovia. If primarily, then the inflammation quickly spreads to the synovia. Colonies of bacteria and abscesses may be seen in the meshes of the marrow. The bone shows, in places, productive osteitis, in places rarefying osteitis. In true suppurative inflammations the bone trabeculae are killed to a greater or less extent. The cartilage suffers in the same way. Its death leaves the bone end exposed. In the milder inflammations, especially the gonococcal, fibrous adhesions form in the joint, but in the severe ones the entire joint quickly becomes disorganized. The bursae communicating with the joint suffer also, and after the rupture of the joint capsule, the circumarticular tissues may become involved. The inflammation caused by the streptococcus, staphylococcus or pneumococcus is essentially a destructive one, that caused by the typhoid bacillus or gonococcus alone is distinctly less so.

Inflammation of the inner layer of the periosteum and of neighboring bursae and tendon sheaths is often added to a gonorrheal arthritis. Contractures and sub-luxations are frequent. One joint may be attacked alone or several. The knee is most frequently involved. After the acute stages have subsided the disease has a tendency to become chronic and to persist indefinitely.

The result of the morbid process varies according to the cause and to the timeliness and efficacy of the treatment, from a practical *restitutio ad integrum* to a fibrous or a bony ankylosis. Gonorrheal inflammations may heal completely, may become chronic, or may result in fibrous ankylosis with distortions

and atrophy of the bone. Even in the chronic cases, a cleaning up of the focus of infection may cure the joint disease. Typhoid arthritis may recover completely, but often results in dislocation, especially in the hip. If a suppurative inflammation be added, it may cause ankylosis. As long as an inflammation by pus cocci is restricted to the synovia, there is hope for a good functional result, but if the marrow be involved, a bony ankylosis is the best we can hope for. In children the outlook for motion is more favorable than in adults.

SYMPTOMATOLOGY.

Pain and restriction of function are the two main symptoms, both varying in intensity as the cause of the infection and its virulence. Fluid is almost invariably present in the joint, except sometimes with gonorrheal arthritis. Motion is painful, and the synovia is sensitive to pressure. The joint is held in the attitude most comfortable to the patient—usually semi-flexion.

Prognosis. Simple gonorrheal or typhoid arthritis is in itself not dangerous to life. The prognosis in pneumococcic and suppurative arthritis is much graver. In the last two, death may quickly supervene unless prompt treatment be instituted, or even in spite of it. If the patient survive the acute stages he may die later of exhaustion. Relapses are frequent in gonorrheal arthritis unless the causal lesion has been cured.

Diagnosis. That we have to deal with an acute arthritis is easy to establish. Our main problem is to determine the nature of the inflammation.

In non-infected traumatic arthritis, while there may be a slight rise in temperature (one degree), constitutional symptoms are conspicuous by their absence.

Acute inflammatory rheumatism has its acute pyrexia, its *fleeting nature,* its acid sweats. The view has always been maintained, by none more vigorously than by the writer, that this affection disappeared completely, leaving no trace, and was absolutely unconnected with chronic arthritis. If Poynton and Paine can succeed in establishing the truth of their contentions (and it must be admitted that they maintain their arguments with great force) we shall be compelled to change our opinions radically.

Pneumococcic inflammation occurs in the late stage of pneumonia, or after the disease has run its course. It is wont to be very severe, and to be accompanied by grave constitutional disturbance.

Simple typhoid arthritis occurs in the later stage of typhoid, or in convalescence, is not very painful as a rule, and does not greatly aggravate the existing disease. It is most frequent in the hip.

Gonorrheal arthritis may occur in the florid stages of the urethral trouble, or long after the acute symptoms have subsided.

Fig. 9.

Photomicrograph of normal joint capsule, rather high power. Joint surface above. Note the vascular spaces.

Other gonorrheal complications may also be present. It is the most frequent in the third week and in adult males, and in their urinary tract may be discovered the evidences of specific inflammation. Pregnancy, labor, and the puerperium predispose in

Fig. 10.

Low power photomicrograph. Capsule from a normal knee joint of an adult man dead of alcoholism. The specimen is from a recess of the joint. Note the folds of the synovia. Zeiss, objective, aa. Ocular 3.

women. The real invasion of gonorrheal arthritis is often preceded for several days by pain in various joints. Possibly several joints may be lightly involved. Then the inflammation seems to concentrate upon one or two joints, and expends its energies upon them. The temperature may run rather

high, but not, as a rule, as high as in streptococcic or staphylococcic inflammations, nor is the constitutional involvement nearly as serious. The slower cases—those with a fibrinous exudate—occasion little difficulty in diagnosis, if the possibility of a gonorrheal lesion be borne in mind.

As a rule arthritis due to the pus cocci is severe from the start. The pain is very great, and the constitutional disturbance is severe. A penetrating wound, the pre-existence of scarlatina, measles or

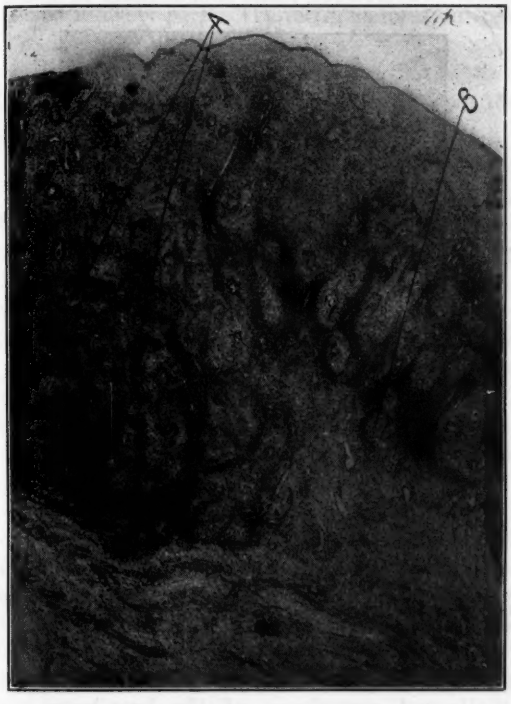

Fig. 11.

Synovial tuberculosis. Section from synovial membrane showing typical tuberculosis, about 20 diameters. A—areas of necrosis. B—Giant cells.

smallpox, the presence of a suppurative process elsewhere, all point to this type of infection. An acute inflammation in the joint of a young child is almost always a streptococcic or staphylococcic one, unless he has had pneumonia.[1] Besides a hemophiliac joint, already described, if a joint swell up suddenly, almost painlessly, and without sufficient cause, a Charcot joint should be thought of and search should be made for a spinal cord lesion.

The blood count will not be of great service. A leucocytosis may be present on any acute joint inflammation. Possibly it will be greatest in an ordinary streptococcic or staphylococcic arthritis. In acute inflammatory rheumatism it will be of the neutrophilic type.

Aspiration is a most valuable help, when the surgeon is in doubt. Pus cocci and pneumococci can be demonstrated, if they be present. Gonococci can sometimes be found in gonorrheal joints, sometimes not. From typhoid joints the fluid may be

Fig. 12.

Photomicrograph of proliferating synovia. Zeiss objective aa. Ocular 2; from a case of probable syphilitic arthritis of the knee, wrongly diagnosed as tuberculosis, and secondarily infected following operation.

sterile, it may contain typhoid bacilli, or typhoid bacilli and pus cocci.[2]

The Roentgen rays are not of great use in the diagnosis.

TREATMENT.

Acute articular (inflammatory) rheumatism has

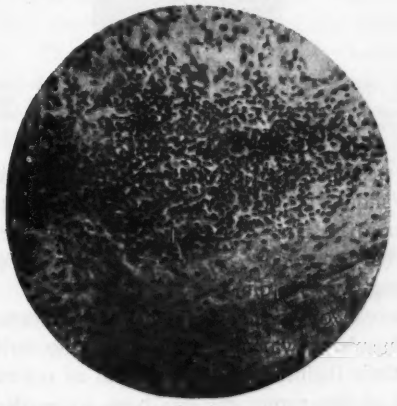

Fig. 13.

Proliferating synovia. Same case as Fig. 12. High power, Zeiss D.D., ocular 1. Inflammation, round cell. Infiltration.

been considered as belonging in the domain of internal medicine. If the affected joints be immobilized during the acute stages of the disorder, the pain will probably be less. The wisdom of removing the possible source of the original infection (diseased tonsils!) after the attack has subsided, is apparent.

(1) Rovsing maintains that many of the acute arthritides in young children are really cases of synovial tuberculosis.
(2) A. G. Ellis, Journal of Infectious Diseases, 1909, Vol. 6, p. 181.

Typhoid arthritis. Rest, protection, and the avoidance by attitude of dislocation, so frequent in this affection, are our chief concern. The hip is the joint most frequently dislocated. The attitude to be avoided is one of flexion and adduction. If much fluid accumulate, the joint should be aspirated under strict aseptic precautions. If a pus infection be added, the symptoms become those of an ordinary suppurative joint, and the treatment will be that of the latter.

Gonorrheal arthritis. The causal lesion must receive prompt and thorough treatment. The joint itself should be put at rest, either by splints or by plaster of Paris.[1] If much fluid be present, it may be aspirated. Some authorities recommend washing out the joint.

Fig. 14.

Short plaster spica. The tied bandage at the side is the "scratch" bandage, which passes next the skin under the plaster, and keeps the skin in condition. It is drawn up and down every day, giving the patient a dry rub.

The use of vaccines and of anti-gonococcus serum has been warmly debated. Many writers affirm their inefficacy, but in several of my cases the relief of the symptoms has been so marked after the administration of anti-gonococcic serum, that I should advocate its trial. A secondary infection by pus germs demands prompt and radical treatment, but fortunately it is not very frequent.

Pneumococcic Arthritis. We must be governed here largely by the condition of the patient. If the joint contain very little fluid, or if the fluid be serous, and if the constitutional involvement be not great, we may temporize. Numerous cases of cure by simple aspiration and immobilization have been reported. If the joint be full of pus, and if the constitutional symptoms be severe, the sooner we resort to operation, the better. The joint must be laid open and thoroughly drained.

Arthritis Caused by Ordinary Pus Cocci. Pus infection of a joint should always be avoided if possible. All operations on tuberculous joints and abscesses should be carried out with this idea in mind. Tuberculous joints should never be opened and drained. In all operations on the diseased shafts and metaphyses of the long bones, care should be taken to avoid penetrating the joint or approaching too near the joint cartilage. The normal synovial membrane has a very poor ability to resist infection, therefore all joint operations should be carried out with even more rigorous asepsis, if possible, than usual. Probably the safest course with a compound dislocation is to regard infection as inevitable, and to attempt to forestall it by immediate resection. A stiff joint is better than an amputated limb, and either than death.

Fig. 15.

Old haemarthrosis of elbow. Several joints were involved in this patient. But for the history the case might easily be confused with tuberculosis. Note the irregularity of the joint outline and the rarefaction of bone.

It has been fairly well established that even when aspiration reveals the presence of a few pus corpuscles in a joint, a conservative course is often permissible. If the course of the affection be not very severe, and if the constitutional involvement be not marked, we might be justified in immobilizing the joint, aspirating it, and possibly washing it out. The effect of injecting any substances into the

(1) When any diseased joint is put at rest by splints it should be put in the attitude most useful if an ankylosis take place: thus, the knee should be put up in full extension, the ankle and elbow in right angled flexion, the hip in extension and slight abduction, the wrist in slight super-extension.

joint, or of attempting to pull the articular cartilages apart by traction, is probably illusory, and the employment of these measures rests upon an ignorance of pathology.

If the infection be a severe one, or if aspiration reveal streptococci or staphylococci, no time should be lost. We must immediately resort to radical measures. *The joint must be opened and thoroughly drained.* Now, drainage does not consist in making a small incision into the upper aspect of a joint, and letting the pus out. The joint must be drained in every part. The incisions must be free. Through and through drainage by counter-openings is best. I consider gauze far better than drainage tubes. I have had poor results from the latter.

In the hip an anterior and a posterior incision should suffice. In the knee long incisions at the sides of the patella, and another incision in the popliteal space may be used. If the infection be a very virulent one, a more thorough operation is necessary. The incision runs across the patella, the patella is sawn through, the fragments are reflected up and down (or the incision may be a horse-shoe one below the patella, and the patella may be reflected upward), and the lateral and crucial ligaments are divided. When the joint is flexed, its recesses can be easily drained. It should be packed loosely with gauze—the quadriceps pouch should not be overlooked—and should be put up in marked flexion, but not flexion so extreme as to compromise the popliteal vessels. As the infection subsides the joint may be brought gradually into extension, a procedure comparatively simple if the tibial tuberosities have not been permitted to slip up back of the femoral condyles.

In disease of the ankle, excision of the talus will afford free drainage, and will leave a useful foot.

It is said that the punctured wound of the metacarpo-phalangeal joint received from an adversary's tooth in fistic encounters, almost invariably results in dangerous infection, and good authority is behind the advice to amputate the finger at the first sign of the infection, and thus forestall the inevitable here also.

THE SPINE.

The joints of the spine present certain peculiarities. They are rarely involved in an acute suppurative[1] or in an acute gonorrheal or pneumococcic inflammation. When they are so involved, the principles of treatment are much the same as in other joints. A typhoid infection gives rise to a condition that merits a special description.

TYPHOID SPINE.

The nature of this lesion was for a long time disputed, but it is now generally regarded with reasonably certainty as due to infection of the vertebral joints by the typhoid bacillus. No case of a mixed infection is on record. A synovitis of the intervertebral joints would account for the symptoms. The kyphosis observed in some of the reported cases points to the occasional bony involvement.

Symptomatology and Course. The affection, most common in vigorous young men, usually begins in the late stages of a typhoid fever or during convalescence, with pain and stiffness in the lumbar region. Trauma often plays a part, either a causative or an aggravating one. The patient complains of a persistent lumbago. Spasm of the muscles of the back, limitation of motion, and possibly some lateral curvature may be present. In some cases the lumbago gradually subsides, in others it grows more and more severe until the patient is absolutely unable to sit or to stand. The pain comes on in violent paroxysms, often shooting around the abdomen and down the legs. Women who have suffered say that it is worse than labor pains. Hysterical symptoms have often been noted, and rhythmic contractions of the abdominal muscles. The attacks of pain may be ushered in by a rise of temperature of three or four degrees Fahrenheit. The knee-jerk may be increased or diminished. A distinct kyphosis rarely forms. The functions of stomach and bowels may be disturbed. "Starting pains" have been observed at night.

Diagnosis. A severe lumbago, occurring late in the course of a typhoid, or during convalescence, means typhoid spine, but the possibility of a tuberculous lesion following typhoid fever must be remembered.

The disease never is fatal. The patient always recovers, usually completely, but the recovery is slow and tedious. A year is the average duration of the severe cases. Relapses sometimes occur. A kyphosis once formed is permament. Suppuration is unknown.

The treatment is rest. The milder cases do well with strapping of the back to take the strain off the spinal joints. Severer cases demand a light spinal brace or a plaster jacket. For the most severe cases recumbency is necessary, preferably on a gas-pipe frame. The spine must be put completely at

(1) Infectious Osteomyelitis of the Spine. See Strong, The Lancet, 1912, Dec. 7.

rest in order to prevent the attacks of pain. For the paroxysms morphine may be used, or a whiff of ether or of chloroform.

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Tumors of the Upper Abdomen.

The decision as to whether a tumor growing on the lower surface of the liver belongs to that organ or to the gall bladder, or to one of the neighboring organs in question, is sometimes easily solved, but sometimes utterly impossible. Tumors of the pylorus and duodenum can easily be recognized, because they will rescend with inspiration, and they can be retained by the fingure during expiration, while a tumor connected with the liver will rise again with expiration. Tumors of the stomach and intestines also change their position with the inflation of the stomach by air, unless they are strongly attached to neighboring organs.—C. A. Ewald in *The American Journal of Gastro-Enterology.*

MILITARY SURGERY.

Gustavus M. Blech,
Chicago, Ill.

IV.

Asepsis in the Field.

"Non nocere!"

It is scarcely necessary to assert that ideal asepsis as practiced in well-appointed civil hospitals must remain an idle dream on the battlefield. The costly asepticable glass and iron surgical furniture, the high-pressure steam sterilizers, the unlimited quantities of hot and cold sterile water—all these are conspicuous by their absence. The surgeon in the field will be lucky indeed if he discover in his kit a pair of serviceable gloves and enough water to quench the thirst of the sufferers and to boil his instruments. Often the only operating table will be the litter on which the patient is brought in, and even this may not be available—mother earth, covered with something to protect the wounded from direct contact has served as an operating table in many a campaign in the past.

It will be a physical impossibility to avoid rain, sand and undesirable climatic conditions (cold). One of the surgeons accompanying General Mishtshenko in his famous cavalry raid against the Japanese at Yinkou tells us that with all odds against his side he established in the dead of the night a dressing station in the courtyard of a farmhouse (fausa), which looked more like a ruin than a former human habitation, with a temperature many degrees below zero. Here, placing the wounded in a circle around a fire, he worked with frozen fingers and in one case was forced to ligate the palmar artery for a hemorrhage that had resisted all methods of tamponade and compression!

In spite of all this, the first law of operative surgery, "Non nocere!" must be strictly observed and those in charge of sanitary field units must place everything beforehand to satisfy this prime principle of modern surgical therapy.

While in the light of what has been said above, ideal asepsis is impossible, and while many wounds on the battlefield are not aseptic, we certainly have no right to add to the risk already incurred.

Even the argument that the many demanding aid and succor from the surgeons at one and the same time, making time a valuable factor, forms a sort of contraindication to aseptic details, as far as technics is concerned, is without justification. It is true that a truly humane field surgeon will consider all in preference to a few, especially appealing to him from a surgical point of view, but whatever

the number demanding aid, be it ever so overwhelming, the principles of asepsis must never be violated.

Assuming that the reader is thoroughly grounded in them from civilian practice, I need only point to the fact that successful surgery is not entirely dependent on the expensive and permanent equipment of well-appointed hospitals. Surgeons who have done many major operations in farmhouses, in huts, and in barns, assure us of many unbelievable triumphs and the statistics of field hospitals during the last great wars, properly analyzed, are very encouraging in this respect.

Three great principles underlie all aseptic procedures in field surgery:

(1) Sterilization of all materials, such as dressings, tampons, gowns, towels, etc., should be done at home and brought to the field in an aseptic condition.

(2) Everything else, e. g., surgical instruments, must be sterilized on the ground by the simplest available method, and

(3) In the manipulations of many wounded the asepsis of the surgeon's hands must be maintained *not* by repeated sterilization, but by avoiding contact.

(Ad. 1) No further comment is necessary.

(Ad. 2) Provision should be made before an imminent battle to enable the surgeons to sterilize their instruments by boiling. It should not be forgotten, however, that water not infrequently will be looked upon as a priceless possession. Fortunately it will be needed only to quench the thirst of the sufferers and to moisten plaster-of-Paris bandages. Neither the surgeon nor the patient needs water for hands, wounds and operative field. Indeed in field surgery all washings and irrigations are not only out of place, but harmful. If enough is on hand to boil instruments in, well and good; if not, other methods must be resorted to.

(Ad. 3) This is a matter of organization requiring no particular training. The surgeons must instruct their sanitary soldiers to do all work preparatory and subsequently to dressing or operation (exposure of field, opening boxes, application of adhesive strips) so as to keep their hands away from anything non-sterile.

In adopting an aseptic technic the surgeon in the field must know his material on hand.

He will boil his instruments, suture material, drains, etc., not previously sterilized, if water be available. If no regular instrument boiler is available any metal dish from the mess kit will do. In the absence of water, instruments will be dipped into alcohol and then passed through a flame.

The surgeon's hands are best disinfected by rubbing them for five minutes with a piece of gauze soaked with alcohol. Bacteriologic investigations have shown this a fairly reliable method.

The field to be operated on is best and simply treated by dry shaving and one or two coatings of the tincture of iodin. A perspiring skin should be dried by a piece of gauze, as any moisture whatever weakens the bactericidal properties of the tincture.

All washings of the wound are out of place. Gross particles of dressing, dirt, etc., should be removed with dressing forceps. Painting the wound surface with the tincture of iodin is advisable.

The above technic is applicable not only at I, but at II and III as well, though in the latter institutions, owing to better facilities and equipment, surgeons will have an opportunity to follow methods practiced in civil hospitals if these do not otherwise interfere with the work on hand.

V.

ANESTHESIA IN THE FIELD.

Both general (inhalation) narcosis and local analgesia are applicable in the field.

At the frontal stations very little of either will be used—in field, evacuation and base hospitals, of course, anesthesia will precede every important operation.

We have no choice in the general anesthetic—chloroform being the only one allowed. Ether, though acknowledged the safer if not the safest anesthetic, is not available. Its inflammability forms a decided objection to its use in field institutions, where much of the work will have to be done under artificial illumination.

The technic of general anesthesia does not differ from that practiced in civil life. An Esmarch mask is found in every surgical chest. Patients requiring a general anesthetic at regimental aid or dressing stations, should be given a hypodermatic injection of morphin to lessen the need for much chloroform. The exhausted, exsanguinated patients who have just passed from surgical shock are not desirable subjects for chloroform anesthesia. The anesthetic should therefore be administered with great care—drop by drop and well diluted with air. Usually a few drops will suffice for whatever work has to be done at the front.

In the rear institutions the practice does not differ from that popular in our better civil hospitals.

Local anesthesia is applicable anywhere in the field where a sterile solution can be obtained. A hypodermatic syringe and cocain tablets are avail-

able. As regards the method of administration, the simplest and easiest of execution is the best. Schleich's infiltration anesthesia, for example, will prove too delicate a procedure at frontal stations.

The time element is of no importance if the surgeon will not stand by idly awaiting the action of the local anesthetic. During the five minutes he can attend others.

Lumbar anesthesia, though seriously advocated by German military surgeons, has three great objections:

(1) It is not popular in the United States, therefore few are familar with its method of administration.

(2) It requires a set of instruments (special needles) not furnished in the regular kit.

(3) It is not free from danger (meningitis!) and not always effective. It certainly is too risky a method in institutions not sufficiently protected against dust (tents).

VI.

SHOCK.

The degree of shock depends entirely on the organ injured and the extent of the injury. Undoubtedly every gunshot wound produces some degree of shock.

The diagnosis is easy in pronounced cases. Pallor of the face, apathy, a cold and clammy skin, shallow respiration, a scarcely perceptible, fast pulse, great fear and anxiety by the patient, and finally cyanosis of lips (and cheeks)—these are the external symptoms that strike terror in the heart of every surgeon. Here, indeed, we are face to face with threatening death, and heroic measures must be instituted without delay, until reaction—the second stage of shock—has taken place. This stage is characterized by the disappearance of the cyanosis, by an improvement of the respiratory and circulatory phenomena. Restlessness and delirium may now make their appearance.

In diagnosing shock it is important to bear in mind (a) internal hemorrhage, and (b) psychoses.

Internal hemorrhage will be discussed in the subsequent section. Psychoses are not infrequent in battles. The excitement of the terrible examination in the careers of responsible, higher officers, representing a supreme test of their past training, the loss of human lives accompanying tactical moves, the fear of criticism—all these must have a deep psychic effect on highly-organized, nervous systems, such as is usual in highly cultured men. Add to this a disabling though not necessarily dangerous wound, and complete mental collapse, simulating shock may follow. That brave officers, seeing their men run from the enemy, are apt to lose their reason, has been established again and again by the recent campaign in Manchuria.

The diagnosis established treatment must be instituted without a moment's delay.

Rest, with head low, is the first condition. While a wounded man is in shock, *he must not be moved*, and *all surgical operations of any kind are strictly contra-indicated*. Only one exception exists to this rule, viz., *arrest of hemorrhage*.

It is needless to add that if external warmth can be applied, this should be done, especially so in winter campaigns.

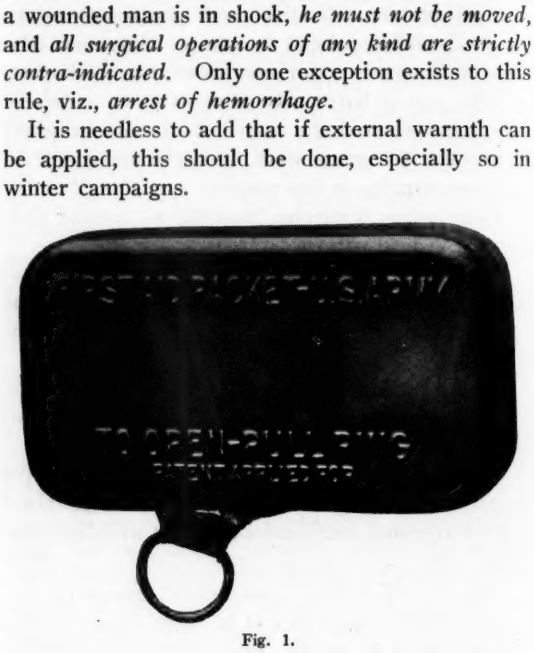


Fig. 1.

As for medication, von Oettingen has recommended the hypodermatic injection of morphin and atropin. He bases his treatment on the fact that shock represents an irritation of the nervous system, accompanied by a paralysis of the pneumogastric nerve. Accordingly, not a stimulant but an opiate is indicated.

Theoretically this is correct, but practically I would urge not to rely on morphin and atropin solely. A stimulant in addition to the morphin-atropin injection will prove exceedingly valuable. As is well known, strychnin, digitalin and similar drugs have been recommended by almost all surgical writers. I have no faith in them whatever. My own experience has been that a lasting effect on the heart in shock can be had from the injection of caffein.

Unfortunately this last drug is not furnished in the medical or surgical chests for hypodermatic use. As the medical corps of the army and navy are willing to benefit from men who have the opportunity to test the value of innovations in therapy, it is hoped that our field equipment will be improved in the near future, especially as that can be done with hardly any expense.

VII.

HEMORRHAGE.

Venous and *parenchymatous* hemorrhages are easily controlled by a compressing (firm) sterile bandage. An experienced surgeon will, of course, never mistake a venous for an arterial hemorrhage, but such errors in diagnosis have been made by the wounded themselves, by their comrades and even by sanitary soldiers, with the result that tourniquets, regular or improvised, have been applied to injured extremities that certainly did not need it.

The prolonged application of elastic constriction is not free from dangers, and surgeons working at frontal stations and field hospitals should, of course, verify the source of hemorrhage by removing the constrictor.

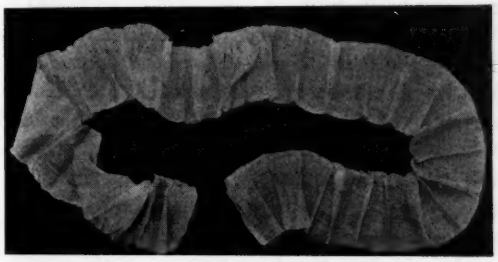


Fig. 2.

In instructing sanitary soldiers or other laymen it is not enough to teach them the difference between venous (dark blood, slow flow) and arterial (bright blood, flow in jets) hemorrhages, for the average layman will forget his classroom teachings at the mere sight of blood, but they should be taught to elevate the wounded limb. In venous hemorrhage the flow will be stopped instantly. This is a rule not easily forgotten.

Arterial hemorrhage, the most important in field surgery, represents also one of the most difficult problems from a therapeutic point of view. The question of personnel rendering aid, the location of the aid station, the dangers of secondary hemorrhages during transportation—all these must be carefully taken into account before formulating methods of treatment.

For the arrest of arterial hemorrhage we have at our command:

(1) Constriction of the extremities.

(2) Tamponade, pressure, etc.

(3) Ligature.

(Ad. 1) In the Drill Regulations for the Hospital Corps U. S. Army (1908), a few pages are devoted to first aid. The difference between venous and arterial hemorrhage is not emphasized, so it must be presumed that the sanitary soldier is expected to know that from his garrison instruction. Section 318 says: "When, however, the bleeding continues after you have used these simpler means (i. e., elevation of limbs, application of cold to wounds, compress and bandage, digital pressure), or your fingers become tired in making the pressure, which they may do after 10 to 15 minutes, you will have to use what is called a 'tourniquet,' and generally will be obliged to improvise one out of material at hand. The principle of such a tourniquet is well understood—a pad or compress placed on the line of the artery and a

Fig. 3.

strap or band to go over the pad and around the limb, so that, when tightened, it will press the pad down upon the artery and interrupt the flow of blood."

The rest is devoted to a description of substitute articles, e. g., a cork, a covered round, smooth stone, etc., as a pad, a handkerchief, cravat for the strap. A stick, bayonet, or something of that kind of sufficient length is to be passed through and twisted so that the pad is pressed firmly in place, and then secured by another bandage.

Instruction is given to apply this "windlass" high up on arm or thigh, and to be careful in the amount of force ("to avoid bruising the flesh") and time of application ("to avoid strangling the limb").

"It is a good rule to relax or ease up in this or any other tourniquet at the end of an hour, and allow it to remain loose, but in place, if no bleeding appears."

I will only add to the above that every sanitary soldier has in his pouch a field tourniquet.

The use of the latter will be very much restricted on the battlefield.

Let us assume that a vessel of importance has been torn by a shot, e. g., the femoral, brachial, etc. If the injured man is to remain on the firing line until a sanitary soldier can come to his aid, that aid will in the majority of instances be too late. Complete exsanguination and death would be the rule. It is to be assumed, therefore, that either the wounded man himself or a combatant comrade will have arrested the hemorrhage by the above described method.

What the sanitary soldier, then and there, should do is to replace the improvised tourniquet by an elastic.

We know that even elastic constriction of an extremity for a period of over two hours will impair distal circulation and thus produce gangrene. This fact suggests the rule that *no one should be permitted to apply a tourniquet under the clothing. The danger of it being forgotten, if hidden from view, is great.**

It goes without saying that the tourniquet as a hemostatic is applicable only to injuries of vessels of the extremities below the groin and shoulder respectively.

(Ad. 2) Tamponade and gauze-pressure do not differ from the treatment of accidental wound in peace surgery. For this purpose officers and men are provided with *individual first-aid packets* which merit attention.

Fig. 1 represents such a packet. A similar one is issued by the Navy and is also obtainable from the First-Aid Dept. American Red Cross. It is a hermetically sealed tin case, 4 inches (10.2 centimeters) by 2¼ inches (5.8 centimeters) and less than an inch thick. It is easily opened by pulling on the ring, visible in the cut. This packet contains two "wound-bandages" properly folded and packed in oiled, impermeable paper. A smaller package contains 2 sterile safety pins. Each dressing-bandage is 3½ inches (9 cm.) wide and 2¼ yards (2 meters 6 cm.) long. In the center of this bandage is a square, thick pad of 3½ inches. By unloosening a simple thread the pad can be made to measure 3½ by 7 inches (Fig. 2).

The following directions accompany each packet (on a slip of paper, inside the container):

"(1) If there is only one wound, carefully remove the paper from one of the two packages without unfolding the compress or bandage and hold by grasping the outside rolls of bandage between the thumb and fingers.

"When ready to dress wound, open compress by pulling on the two rolls, being careful not to touch the inside of the compress with fingers or anything else. Still holding one roll of the bandage in each hand, apply the compress to the wound, then wrap the bandage around the limb or part and tie the ends together or fasten with safety pins. The second compress and bandage may be applied over the first or it may be used for a sling if the arm is wounded or to bind both legs together if one is injured.

"(2) If there are two wounds apposite each other, apply to one wound a compress without unrolling the bandage, and hold it in place by the bandage of the compress used to cover the other wound.

"(3) If there are two wounds not opposite each other, tie a compress over each.

"(4) If the wound is too large to be covered by the compress, find and break the stitch holding the compress together, unfold it and apply as directed above."

The first-aid packet is ideal. The models used by European and the Japanese armies are not as good as ours. For wounds from cannon shells, which, as will be seen later, may tear off one or more extremities, or extensive portions of the human body, larger sized dressings are issued. This will apply to troops garrisoning fortifications and manning battleships.

In spite of the simplicity of the directions accompanying the first-aid packets, it is of course best to instruct all officers and men in their use before the beginning of a campaign. After a man is wounded he is too excited or too helpless to pay much attention to printed matter. By training in time of quiet, the packet will be applied automatically, so to speak, when it becomes actually needed.

(Ad. 3) For the hemorrhages that cannot be controlled by compression, temporary or permanent, the surgeon must resort at the very first opportunity to ligature. If the bleeding artery is easily caught by forceps, a piece of silk is thrown around the vessel and securtely knotted; if not, a threaded, round needle will be pushed through the tissues surrounding the vessel and the suture tied firmly. These two methods are applicable only in large injuries, perhaps where an extremity has been virtually amputated by a missile. Great care should be taken not to allow such wounded out of sight at whatever station first seen, until each vessel has been ligatured, even though the hemorrhage has ceased. The cessation of such a hemorrhage has been repeatedly and erroneously attributed to a closure of the vessels. Transport such a patient and a profuse hemorrhage is sure to recur as soon as the heart-action has improved.

For the treatment of such ceased hemorrhages that are due to vessels injured by small missiles (infantry rifles, revolvers, etc.) at frontal stations, nothing more than a compression bandage, as described above, can, be applied. In such cases we may find either a hematoma or a false aneurysm. These must be sent to the dressing station, or better still, to the field hospital. Such patients should be tagged to attract the attention of the surgeons to whom the patient is sent. The transport personnel

* This has happened quite often in Manchuria. Wounded arrive at the dressing station, dressed, splinted and with tourniquets hidden from view. Finding the dressings dry, they were ordered by the surgeons further to field hospitals—a trip of several hours. There the extremities were found beyond aid. Wreden suggests that if clothing has to cover the tourniquet, the surgeons should be cautioned by a note on the tag.

should be cautioned to look out for secondary—recurring is a better term—hemorrhages.

The treatment of *hematoma* and *aneurysm* will be discussed later.

Concealed, internal hemorrhages will be discussed in the special part.

That stimulating treatment should be instituted to counteract the results of great losses of blood, after the hemorrhage has been definitely controlled, is self-evident. The best remedy is the replacement by normal saline solution. This will largely be possible at regimental aid stations even if an apparatus be available. There is no reason why it should not be provided for at dressing stations, as this has been done in other armies.

A NOTE ON THE TREATMENT OF DIFFUSE AND SPREADING APPENDICULAR PERITONITIS.

SUMMARY OF 78 CASES.

ROYALE HAMILTON FOWLER, M.D.,
BROOKLYN, NEW YORK CITY.

In December, 1908, I reported in the *Annals of Surgery* a series of 69 well-marked cases of diffuse septic peritonitis due to appendicitis which were operated upon at St. Luke's Hospital during the period from July 1, 1898, to Jan. 1, 1908. The cases occurred in the services of Dr. C. L. Gibson and Dr. B. F. Curtis. The result of this analysis will be stated in brief and nine additional cases which have since come under my observation will be discussed.

In the series of 69 cases already reported, 48 deaths occurred, making mortality of 69.5%. Peritoneal lavage was performed in 50 cases with a mortality of 66%. In 19 cases irrigation was not used and they showed a mortality of 78.9%. Postural drainage was instituted in 32 cases with 16 deaths, a mortality of 50%. Fifteen cases occurred prior to 1900, the year this method of treatment was devised by the late George Ryerson Fowler, and 54 cases were after 1900. Death occurred in 18 of the 22 cases in which postural drainage was not employed, making a mortality of 81.8%, or an increase over those treated by postural drainage of 31.8%. The mortality of 15 cases occurring in 1898 and 1899 was 93.3%, the mortality of 54 cases occurring in the successive years up to 1908 was 62.9%. In four cases enterostomy was performed; three died, a mortality of 75%.

During the years 1910, 1911, 1912, but nine cases of diffuse septic and spreading peritonitis due to appendicitis have come under my observation. There is no doubt that these cases are becoming less frequent. Appendicitis is recognized earlier and appropriate treatment is urged by the medical adviser before peritonitis more or less extensive has supervened. A high tribute must be paid the general practitioner and a debt acknowledged for the very important rôle he has played in the reduction of mortality in acute appendicitis. Of the nine cases six were operated upon during the first 24 hours, three at a later period of the disease. Six cases recovered, a mortality of 33 1-3%. The three deaths were attributed to shock and sepsis. Two cases occurred in children (one death), seven in adults (two deaths).

Operative Procedure. Incision in five cases, the McBurney or modified McBurney (Fowler); in four the right rectus incision. The appendix was removed in eight (in one the appendix had sloughed), inverted in seven and ligated in one. All cases were drained. Preference is given the double rubber tubes surrounded by gauze strips, or enclosed by them, introduced, according to indication, to the stump, downward into the pelvis or among the intestinal coils. Peritoneal lavage is not employed by me. Irrigation undoubtedly dilutes septic fluid, and has been the means of saving life when employed in advanced cases. The procedure is not indicated in the treatment of the majority of the present-day cases which are of a spreading or mildly progressive nature. Its employment tends to provoke the formation of multiple abscesses. All cases were treated with postural drainage before, during and after operation.

Following healing, three cases showed a hernia at the site of McBurney's incision. Two have been operated upon by me and have remained cured.

The Lesion. In seven cases the appendix was gangrenous and perforated. In one case peritonitis was due to an empyema of the appendix (spreading peritonitis), in one to a perforated gangrenous appendix with multiple abscesses. In one case of unusual interest a common domestic pin was found in a perforated gangrenous appendix, completely surrounded by a hard fecolith. This case was reported in the *Annals of Surgery,* under title of "Foreign Body Appendicitis," in November, 1912. In four cases a thin yellow sero-pus was encountered about the cecum and in the pelvis, in one case thin pus was found in the right upper quadrant, about the cecum and in the pelvis it was somewhat thicker, in one case thin yellow pus with multiple abscesses. Three cases represented an exudate peritonitis. Insofar as it is possible to de-

termine the extent of peritonitis in these cases, it appeared to me in all cases to be limited to the right half of the abdominal cavity. Five cases were of diffuse, four were of spreading peritonitis. The exudate was not, however, a clear serous type. Of the three fatal cases, two survived twelve hours following operation, and one the twenty-four hour period. The latter case required an enterostomy for the relief of dynamic intestinal obstruction which became complete immediately following operation.

After careful consideration of these cases, I would conclude:

(1) It is strongly advised that suspected cases of acute appendicitis be placed and maintained in the Fowler position. Early institution of postural drainage is of greater benefit to the patient in preventing septic material from reaching the diaphragmatic peritoneum than in preventing further absorption after this area is once involved. Ambulance cases of appendicitis should be brought to the hospital in the sitting posture. The trunk should be elevated during the operation. The cart which transfers the patient to and from the bed should be elevated at the head. The manner of instituting postural drainage matters but little, provided that the pelvis is sufficiently low for gravitation to take place, and the patient is comfortable. It has been shown (Buxton) that there is a rush of bacteria toward the diaphragmatic lymphatics of the peritoneum as soon as infection comes in contact with it.

Figure One shows a sliding block;

Postural drainage, to be effectual, therefore, must be maintained all the time. R. C. Coffey has demonstrated that it is necessary to elevate the body as high as 45-50 degrees to ensure drainage of the lumbar depressions. At the German Hospital a wooden frame is employed to raise the head of the bed, and a folded pillow is placed beneath the knees, held in place by a bandage, which prevents the patient from slipping. This secures an elevation of seven, thirteen or twenty inches as desired. At the Methodist Episcopal Hospital graduated blocks are employed. These have been devised by my colleague, Dr. Chas. A. Anderson, of the hospital staff, to whom I am indebted for the photographs (Figs. I and II). At St. Luke's Hospital, Borough of Manhattan, a back-rest is employed such as is used for cardiac cases, and the foot of the bed is elevated. At St. Luke's Hospital in Richmond, Va., a wooden frame is used to support the patient who lies upon a flat mattress, the head of the bed being elevated. Swings, hammocks, steamer chairs, rocking chairs and special beds have been used for this purpose. It is difficult to maintain some patients, who are under mental strain, in the semi-sitting posture; in such cases muscular tension may be relaxed by having the patient lie flat; they are frequently unconscious of the elevation when well supported by a pillow or protected wooden rest.

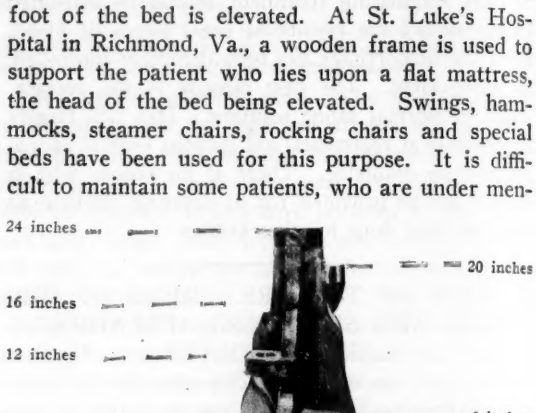


Figure Two, four stationary stocks for different elevations.

(2) Oschner's treatment should be instituted before and after operation and Murphy's protoclysis should be practiced.

Year	Cases	Deaths	Mortality	Irrigated Died		Not Irrigated Died		Postural Drainage Died		No Postural Drainage Died		Enterostomy Died	
1898...	4	4	100%	4	4	0	0	0	0	4	4		
1899...	11	10	90.9%	8	7	3	3	0	0	11	10		
1900...	8	6	75%	6	4	2	2	1	1	7	5		
1901...	5	2	40%	4	2	1	0	1	0	4	2	2	1
1902...	2	2	100%	1	1	1	1	0	0	2	2	1	1
1903...	4	4	100%	2	2	2	2	4	4	0	0		
1904...	10	7	70%	8	6	2	1	6	3	4	4		
1905...	7	4	57.1%	4	2	3	2	5	2	2	2		
1906...	7	5	71.4%	3	2	4	3	4	2	3	3		
1907...	11	4	36.3%	10	3	1	1	11	4	0	0	1	1
1900 1913...	9	3	33 1/3%	0	0	9	3	9	3	0	0	1	1
Total .	78	51		50	33	28	18	41	19	22	18	5	4
Mortality	66+%			66%		64+%		46+%*		81.8%*		80%	

*Statistics since 1900, *i. e.*, when postural drainage was first advocated.

Bear in mind that tuberculosis of the bones in children has a better prognosis than the same disease in adults. Use tuberculin in conjunction with your other measures.—Bernays' Golden Rules of Surgery.

HEAD INJURIES.

CLINICAL REPORT.

AP MORGAN VANCE, M.D.,

LOUISVILLE, KY.

In the thirty-five years of my active surgical career, it has been my fortune to attend many cases of injuries to the head. Thinking probably a clinical relation of a few might be of some interest, I chose the above title, picking out eight cases from whom I had saved the specimens of bone removed.

CASE I.—J. McC., man of splendid physique, forty-five years old. The history culled from this man and his father, who brought him to me, was this:

Twelve years before, when on a spree in New Albany, Indiana, he had a fight in a livery stable and was struck on the right side of the head, about half way between the ear and median line, with an iron shovel, a scalp wound resulting. He was unconscious for three days and for three months was paralyzed on the left side, but recovered and was able to work on the farm. Epilepsy of a severe type developed, to render his life more or less miserable, the attacks being oftener and more severe when he was drinking. Two months before he called on me, while in his cups, he went to the same stable where, twelve years before, he had been hurt, and asked for the man who hit him. He was directed across the street to a rival livery stable, being told as a joke that a man there was the one he was looking for. He crossed the street, picked up a heavy iron rake and brained the fellow indicated. After lying in jail for the above period, he was brought to me. I advised, after an examination, that his head be opened, the site of the trephine being under the scar, the center of which was very tender. I put him in the St. Joseph's Infirmary and arranged for the operation at 4:00 o'clock the next morning. About daybreak, the Sister Superior telephoned that the man was crazy and was so violent she could not manage him. He was removed to the City Hospital and the bone button (fig. 1) was removed with an old-fashioned trephine, the exquisitely tender point being taken as a guide. After the button was loosened it still hung, and on removal gave evidence of being roughened. The dura also was rough and bleeding when the bone was lifted. The man recovered quickly, had no more epilepsy, and after leading a much better life, died of pneumonia, ten years later.

A few days before he came to me, while in jail, he backed up against a hot stove and burned the end of his left thumb very severely. This did not disturb him at all, until after the operation, when he complained that it was no longer numb, but pained him badly. This man was acquitted of the charge of murder on my testimony that he was irresponsible, partly from the fact that he was drinking, but also in consequence of the old injury.

CASE II.—Judge X, a distinguished jurist, ten years ago came under my surgical care in consultation with Drs. Thompson and Koehler of Louisville. He was forty-five years old. The history obtained was, that while on a trip to New York, he was lost. When finally discovered by his friends, he was minus watch and money and otherwise much the worse for wear. While on the train coming west, he was thrown against a sleeping car birth, striking his head. For three weeks after getting home, he seemed somewhat dazed. He would call on friends and go about, but seemed forgetful of passing events. Two days before I was consulted as to the surgical possibilities for relief, he had gradually lapsed into a complete coma, the left side becoming paralyzed first, then the whole body, including the face, which was drawn to the left side. Sensation on the whole left side was entirely absent, a little being left on the right side. Bowels and bladder paralyzed; eye reflexes absent, exaggerated stertor with every evidence of approaching dissolution. Pulse 150, temperature 103°F. He was removed at once to the St. Joseph's Infirmary, after the consent of the family had been obtained to the forlornest of forlorn attempts to save his life by opening the skull. After the scalp had been shaved, the head showed a curious condition; the whole scalp was edematous, but the right half in addition presented the appearance of an angioma, the veins were so greatly dilated. Very little anesthesia was needed and with a chisel, a piece of bone as large as a dime was quickly removed, the resulting opening being rapidly enlarged to the size of half a dollar with rongeur. The dura bulged decidedly, with no pulsation evident. It was incised and the brain explored with a long suction needle, a moderate amount of fluid being obtained each time, possibly half an ounce or more altogether. The man was put to bed after the wound was closed with drainage, the family being told he would be dead within a half hour. It was about eleven o'clock at night when he was returned to bed and the nurse was told to call me if needed. At eight o'clock the next morning, when I returned, she said he was all right and had just had a drink of water, holding the glass in his left hand. This

man made a rapid recovery and in a few weeks was as good as new and has held responsible public positions in his profession ever since. The only sign of his trouble left, is an occasional twitch about the left side of the mouth. What pathology existed in this case, I do not know; I looked up all the literature and the only condition resembling it is what is designated by two or three authors as "wet brain." I believe it was really a case of obstruction of the venous return at the base and that the decompressing operation caused the brain to resume its work. I also believe that the withdrawal of the fluid had something to do with this result.

CASE III.—Some fifteen years ago I was called to attend a white boy, ten years old, who a few minutes before had been knocked down by a street car, the front of the car passing over him, being stopped when his body was under the front trucks. The car was lifted and the boy crawled out and walked to the curb. After being carried one square to his home, I saw him. He was terribly shocked, but after an hour he reacted and upon examination I found his scalp had been torn from both sides of his skull. While I waited for the boy to recover sufficiently to examine him, a piece of his right parietal bone (fig. 3) which had been found in the street was brought in. The left side of the denuded head was filled with street dirt; the right, from which the bone came, was clean. A strip of scalp down the center was left attached and separate dressings were applied, after cleaning and adjusting the parts as best I could. This boy was hurt on the 13th day of December and I attended him until Christmas morning, when the father became drunk and insisted on my soaking the dressing off. When I declined, he discharged me and the doctor who was called in did soak the gauze to make it come off more easily. The uncovered meninges became infected, and the boy died three days later. I feel certain, if this case had been handled properly, this boy would have recovered, as he was in good condition when I was discharged.

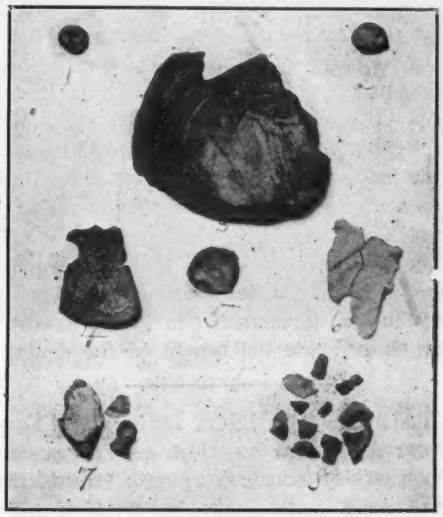
CASE IV.—J. F., white, male, while playing baseball in a town in Southern Indiana, was struck on the head, just above the left ear, by a ball thrown by the pitcher. He immediately dropped as though he had been shot and was unconscious for a short time. He was removed to a neighboring drug-store and, some time after midnight, boarded a train for Louisville. Upon arriving here, he walked a distance of six or eight blocks to his home and went to bed. He did not get up the following morning as usual, and his wife noticed that he was irritable and restless. She sent for Dr. W. A. Keller, who found the man was irresponsive, but upon persistent questioning he showed some intelligence and pointed to the side of his head, just about the middle of the parietal region. Dr. Cecil was called and advised that a surgeon be consulted. The man had been injured on Sunday, and Dr. Cecil saw him on Monday afternoon. I was called to see him on Thursday and advised opening the skull. By that time the patient had become very restless and almost uncontrollable. My suggestion was declined and they subsequently called Dr. W. A. Rodman, who also advised operation, which they again declined. Nine weeks later I was again called to see him and found simply a living skeleton. All these weeks his wife had fed him, with a spoon, whites of eggs, milk, gruels, etc. Sordes filled up his mouth so that even broths could hardly be gotten through it. I again advised operation, and after a few days he was removed to St. Joseph's Infirmary. With an osteotomy chisel I removed the button of bone shown in fig. 4. His pulse was very slow and weak and his eye reflexes were almost entirely irresponsive, and, altogether, he looked like a dying man. The pia mater looked almost exactly as if soot had been dusted on it with a pepper-box. I wiped all of this out and closed up the wound with drainage. He was put to bed more dead than alive, and his wife stayed with him and fed him drop by drop, and at the end of three weeks he went home, where I saw him occasionally. The wound healed kindly. At the end of the thirteenth week after the injury he sat up in a chair and asked: "Who are you and what are you doing here?" He recovered completely and is now working at his old trade as a moulder in a foundry. He remembered nothing of the accident.

CASE V.—Boy ten years of age, while playing in a ditch dug under a street car track, raised his head just as a car approached. The fender struck him back of the right ear, producing an extensive compound, comminuted fracture of the skull, the mastoid region and the area back of and above the ear being crushed. The lateral sinus was uncovered for an inch. The boy crawled out of the hole and walked a square to a nearby physician, who called me. The pieces of bone shown in figure 5, and several other pieces, since lost, were removed, the edges were smoothed and the scalp sutured over the opening without drainage. The dura was not injured. The boy had no focal signs, and he quickly recovered. He wore a firm leather shield over the large soft place for several years and finally the tissues overlying became firmer and this protection was dispensed with. He is now a young man, and only a short time ago I was applied to by an insurance company to know if I considered the old

injury as a modifying element in connection with an insurance risk.

CASE VI.—A young man of 27, who was landed at my office unable to walk without assistance, and unable to talk so as to be understood, being paralyzed on his right side, with contractions of both arm and leg. He had an ordinary express tag pinned to his coat which read: "Take me to Dr. Ap Morgan Vance, 218 W. Chestnut Street." After struggling with him for some time, in an ineffectual effort to learn something of his antecedents, he mentioned the name of a minister friend of mine, who lived in Russelville, Ky. After I had placed the man in an infirmary, I learned from this minister all he knew of the case. He also sent me a letter from the man's mother, giving the history that five years before he had been assaulted, being struck over the left eye with a sling shot. He had suffered with epilepsy and had lost his speech and power of locomotion, soon after the injury. The letter gave me permission to do what I thought best in an effort at relief. Examination revealed an old depression over the left brow and temporal region. I endeavored to do a bone flap operation, but the brain bulged so much after the dura was incised that I found this impossible, so removed the piece of bone shown in figure 6. The brain was covered witht soot-like material—evidently what was left of an ancient clot. The dura and scalp were replaced with abundant provision for drainage. The drainage was very profuse for days, soaking the voluminous dressings that were frequently applied, the bulging brain receded, so that a great depression resulted. A few days only elapsed before this man began to talk. Before he left for home, at the end of four weeks, he could walk with comparative ease. Later, news from him said that the epilepsy was cured and the man was able to work and earn his own living, the paralyzed and contracted limbs being greatly improved.

CASE VII.—A young man, very despondent over a love affair that did not run smoothly, decided to end it all. He unscrewed the barrel from the chamber of a long .38 Smith & Wesson revolver, placed the shortened pistol on top of his head and pulled the trigger. He then walked down from the third to the first floor of his brother's home, into the midst of the family. His brother took in the situation and telephoned to me to meet him at the Infirmary. I was ready when he arrived there and he was brought to the operation room sitting upright in a rolling chair. He was perfectly intelligent and able to walk. An effort had been made to deceive me by the story that this chap had fallen down stairs and cracked his skull. Under the anesthetic, the head was shaved, revealing a large stellate wound on a line with the right eye, about the junction of the frontal with the parietal bone, blood and brain matting the hair. Lifting the powder-burned scalp, a hole in the skull was shown, large enough to easily admit my thumb. The cleaner looking pieces shown in this bunch of bones (fig. 7) were found with the sliver of lead. The darker fragments were removed, with much brain matter and hair, from deep down near the base, forceps guided by the finger being used. No more fragments of lead were discovered. The great cavity was cleaned out with strips of gauze, the



wound closed without drainage. Coaptation being incomplete, this was not necessary. The man rapidly recovered, and regained his usual health, which had been below par. He had no focal signs whatever. He very soon married the girl in the case and I think has had more sense than before. The falling down the stairs story went with the public and he holds the responsible position he held before.

CASE VIII.—Man, age 50, a great sufferer from asthma, and also from business reasons, placed a 38 caliber pistol to his mouth and was found by his wife in the bathroom, only partly unconscious, a moment after the report of the pistol. I was called by Dr. C. W. Hibbitt, the family physician, within half an hour. Examination revealed a large hole in the roof of the mouth, a little anterior to the junction of the soft with the hard palate, and just a little to the left of the median line of the top of the skull was a little bunch giving evidence that the bullet had gone entirely through the brain. The

left eye protruded and marked ecchymosis was present. We did nothing, thinking that the man would surely die promptly, but he did not. The mouth was attended to by antiseptic sprays and liquid nourishment was given. Six weeks passed. The mouth wound healed and the man showed only moderate mental hebitude. This seemed to be getting a little more marked and I advised the removal of the bullet, which was done, along with several pieces of skull, two of which, with the bullet, are here shown (fig. 8). This man is as well as ever except the sightless left eye. He still has his asthma and is shy about going out. He goes down town, but had not returned to his business at the end of a year and a half. I have seen several of these brain wounds by the oral route, but this is the first one I have ever seen that did not immediately cause death.

I suppose every surgeon has such head injuries to handle, but I thought these would illustrate one point at least, that is, that no hope is too forlorn to give a chance. I have been many times criticised for operating upon dead men, but some of those dead men are now live and useful and this with me always clinches the argument—self and surgery should be sacrificed in giving almost any "forlorn hope" case the benefit of the doubt.

TALIPES EQUINUS DEFORMITY.

A REPORT OF THE OPERATION AS PERFORMED IN NINE CASES OF ACHILLES TENDON ELONGATION, KANGAROO TENDON BEING SUBSTITUTED FOR PARAFFIN SILK AS SUTURE MATERIAL.

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In the nine cases which constitute the basis for this brief note I employed the technic of Achilles tendon elongation as described to me by Dr. Fuld, of New York, in which, however, I substituted kangaroo tendor for paraffin silk.

Of these nine cases one (shown in Figure 2, before and after operation) was a congenital simple equinus—a condition which our best authors describe as rare. The ninth was a traumatic equino-cavus. Four cases were of equino-varus. The other three were of equino-valgus. In the latter cases, in addition to the tendon elongation, various transplantations were done to complete correction.

Tendon elongations, when applied particularly to contractures of the tendo Achilles are rarely considered necessary in children. Simple achillotomies are made in most instances and after-results seem to show that nothing could have been gained by more complicated surgery. Even in adults elongations are frowned upon by some orthopedists, but after the age of eight years some other procedure than complete tenotomy of the tendo Achilles is quite within the range of good orthopedics. The cases operated upon were all over eight years of age, the oldest being fourteen years.

The operation is a very simple one.

1st: Expose the tendo Achilles by an incision directly over the tendon and through the skin and subcutaneous tissue. It should be ample enough to give plenty of working space.

2nd: Clean off the tendon anteriorly and posteriorly, then by inserting retractors clear the field of operation.

3rd: Two strips of sterile gauze passed underneath the tendon at either extremity of the incision will keep tissue and slight hemorrhage from interfering.

4th: A blunt instrument (a periosteal elevator does very well) is passed underneath the tendon, raising it to the surface of the wound, which makes the next step easy.

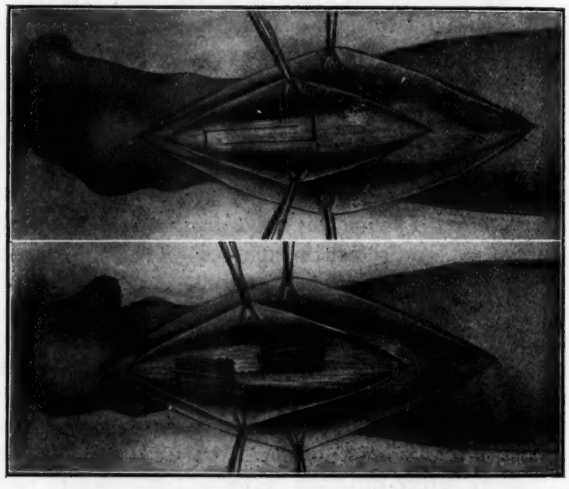

Fig. 1—A. "Inverse L" incision in Tendo Achilles.
B. Suturing completed.

5th: The sheath is incised for its entire length and carefully stripped to either side.

6th: Having previously made certain as to the increase in length necessary for the correction (by a pattern in paper), incise as the accompanying figure shows. (Fig. 1, A.) The tendon straightens out, folding upon itself at *d*. (Fig. 1, B.)

7th: Paraffin silk, as stated above, was recommended as suture material to be used in quilting the edges of the tendon from above downward (*c*). Silk is utilized by a great number of authorities in tendon work, but it seemed to me advisable to have an absorbable suture within the sheath. A non-absorbable material after encapulation might interfere with the action of the tendon. It would also last as a permanent foreign body.

Kangaroo tendon was the suture material selected for the cases operated because it could be depended upon for its tensile strength and absorbability.

A twenty-day kangaroo tendon was used to quilt the edges of the tendon. In figure 1-B two single sutures can be seen. It has been conclusively proven by numerous experiments that the tendo Achilles will grow together after a complete tenotomy in about six weeks. Nevertheless, the

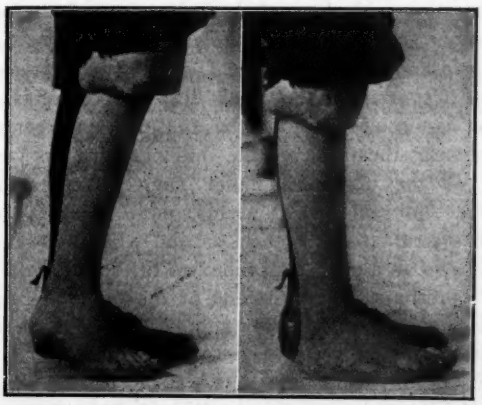

Fig 2. Congenital simple equinus, before and after operation.

above-mentioned sutures were used to simply bridge over the open spaces as shown in 1-B and aid the tendon in its repair process as well as giving strength until growth was complete. They were kangaro tendon and especially made* for this operation to last forty days. Tests made by introducing a strand of the kangaroo tendon deep in the wound

Fig 3. Traumatic equino-cavus, before operation.

and protruding from the incision showed the loss of one-half inch at the end of thirty-five days.

8th: After quilting and bridging is completed the sheath should be picked up and sutured over the tendon with fine chromic catgut.

9th: The operation is concluded by any procedure the operator may choose to close the subcutaneous tissue and skin. I use the deep subcuticular method leaving very little scar. No dressing is necessary excepting some shaken sterile gauze. No drainage is needed.

10th: A plaster of Paris cast is applied, extending well above the knee. The foot slightly overcorrected, allowing for moderate contracture after the cast is removed.

The plaster remains for six weeks, the patient being about. It is removed at the expiration of this period and measurements are taken for a simple club-foot brace.

Some passive motion is given to the part and a light cast is re-applied until the brace is ready. It is necessary to carry this plaster cast only to the knee.

The equinus deformity in every case was completely corrected.

The case of congenital simple equinus (Fig. 2) was that of a boy thirteen years of age. The deformity bothered him and he was sensitive about

Fig 4. Equino-cavus corrected. Note fenestra in plaster of Paris for dressing over tendon.

it, because it was so marked. He remained in the institution until the second cast was applied and then was discharged to return to out-patient department for the brace. In the meantime he secured a position in the New York Messenger Service and removed his own cast some two weeks after leaving the hospital. He came to the dispensary some time later to tell me how good he felt and that he did not want a brace. Treatment extended over a period of ten weeks.

The case of traumatic equino-cavus was that of a woman, aged 25, whose deformity, before operation, is well shown in Figure 3. The *x*-ray picture showed the tarsus and metatarsus in the same line as the tibia.

When 12 years old this patient was thrown from a seat in a merry-go-round against an upright pole. Thereafter she developed an increasing limp for which she never received treatment.

Recently a heavy piece of furniture fell against the deformed left foot, producing a sprain of the ankle which, interfering with walking, induced the patient for the first time to consult a physician, with whom I saw her in consultation.

By the operation above described I lengthened her Achilles tendon 1¾ inches; the cavus was corrected by fasciotomy; the flexion of the toes was relieved by tenotomies.

Figure 4 shows the deformity reduced and the foot in fenestrated plaster of Paris, which is to be replaced by a brace.

78 SOUTH SWAN STREET.

*Meincke.

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WALTER M. BRICKNER, M.D., Editor

NEW YORK, MAY, 1913.

THE INTERNATIONAL ABSTRACT OF SURGERY.

For the third time we pay respectful tribute to our excellent contemporary, *Surgery, Gynecology and Obstetrics,* and to its indefatigable and broad-visioned managing editor, Dr. Franklin H. Martin, of Chicago. He founded, and for eight years has conducted, one of the best surgical journals in publication. He established, and in three years has developed to triumphant proportions the novel and thoroughly helpful Clinical Congress of Surgeons of North America. And now he has seen, and with a few months' preparation has met the great need of English-speaking surgeons (of all specialties) for a complete monthly index and comprehensive abstract of the world's surgical literature.

The first issue of the *International Abstract of Surgery* appeared with the February *Surgery, Gynecology and Obstetrics,* and its initial form gave ample evidence of the usefulness as a current abstract and completeness as an index which care in preparation will afford as its numbers multiply.

Some time ago, describing editorially the then rather new French surgical abstract, *Journal de Chirurgie,* we commented on its completeness and on its special features. Among the latter are programmes of recent meetings of surgical societies in the large cities of America and Europe, lists of surgical books and, of especial importance to bibliographers, of theses. These we did not find in the February *International Abstract,* but the preface to the March issue promised to include them. Since, moreover, the publication is to be conducted in collaboration with *Journal de Chirurgie,* and the new German abstracts, *Zentralblatt f. d. gesamte Chirurgie* and *Zentralblatt f. d. gesamte Gynäkologie und Geburtshilfe,* no doubt it will soon adopt all that is deemed best in these European reviews. The classification of the bibliography, as well as of the abstracts, under subjects rather than under journal titles, seems more useful than the system in the French journal which, however, has also an alphabetical index to titles and authors. We presume that at the end of the year the *International Abstract* will supply an alphabetical author-and-subject index to both abstracts and bibliography which latter, we hope, can be separated in the bound volume. We would criticize the reference to journal articles by year, volume number and page only. It would be more serviceable to supply the date also.

The first (February) issue covers the literature since August, 1912. It occupies 128 pages of the size of those of *Surgery, Gynecology and Obstetrics,* is illustrated with excellent half-tones, and was prepared by large, representative editorial and abstracting staffs. The abstracts are all signed.

It seems to us that the *International Abstract of Surgery* will be indispensable to every English-speaking surgeon who appreciates the need of a thorough digest of recent surgical literature and the great usefulness of a classified index to it.

W. M. B.

THE CAUSE OF DEATH IN ACUTE INTESTINAL OBSTRUCTION.

The similarity of the constitutional symptoms in acute peritonitis and acute intestinal obstruction has long been recognized. The peculiar constitutional effects of intestinal palsy, whether due to paralysis of the musculature of the bowel from infiltration with inflammatory products, or to over-distention as a result of obstruction, have been identified in a wide range of intestinal lesions.

It was once thought that the symptoms of peritonitis were due to the absorption of bacterial products from the peritoneum, and that acute obstruction simulated peritonitis because the products of intraintestinal fermentation transuded through the intestinal wall to the peritoneum.

Enough data are at hand to show that a patient with fatal acute peritonitis dies from much the

same cause as does a patient with fatal acute obstruction. The septic absorption from the peritoneum is not the vital factor. A patient may have a large amount of septic material enclosed by peritoneum, but if the peritoneum involved is not that of the intestine, the condition is not different from that of an abscess in any other part of the body. But let the peritoneum of the intestine be involved, and the picture becomes entirely different, if the peritonitis is of such a character as to produce paresis of the gut by infiltration of its musculature.

Enough experimental studies have been added to our clinical observations to show that the serious symptoms arising in intestinal obstruction are due to a toxic substance or substances formed in the intestinal mucous membrane. Stone, Bernheim and Whipple have isolated a toxic principle from the mucous membrane of obstructed intestine. They found that it is not a bacterial product. It causes symptoms of ileus when injected into an animal; it is found in increasing quantity or virulence from the ileum to the duodenum; and it is not found in the unobstructed bowel.

What is most interesting is that animals may be rendered less sensitive to intestinal obstruction by graduated doses of this substance (*Johns Hopkins Hospital Bulletin,* June, 1912). To think of employing immunizing injections in the treatment of intestinal obstruction would at first seem to be a far cry, yet as one contemplates the general toxic character of the symptoms its reasonableness becomes apparent. While vaccination for ileus can not be hoped to cure the disease, there are many cases in which recovery will take place if some force can be brought to bear to turn the current of events even slightly in the favor of the patient.

It is apparent also that the loss of body fluids is a factor to be reckoned with. Patients with acute obstruction who are purged or who lose fluids by vomiting do badly; and it is well known that improvement follows the restoration of fluid to the tissues.

With these facts in mind the surgeon appreciates the greater gravity of high obstruction, the danger of loss of body fluid, the intraintestinal toxic character of the disease, and the possibilities of immunization. J. P. W.

Pus in the popliteal space may be evacuated in three ways: through the middle, and at the sides behind either the abductor tendon or biceps. —*Bernay's Golden Rules of Surgery.*

Surgical Suggestions

Bilateral inguinal herniae that pop in and out of the external rings, are very apt to be direct herniae. They often contain part of the bladder on one or both sides.

If possible, avoid giving an opiate for an abdominal pain until you know its cause. Morphine may mask the symptoms of an acute lesion, e. g., appendicitis, and delay the diagnosis.

Intratracheal anesthesia (Meltzer) is quite acceptable for operations other than intrathoracic. The etherization is almost automatic, danger of over-etherization is minimized, and coughing, straining and mucous accumulation are obviated.

When operating upon an incarcerated umbilical hernia, especially in an old or enfeebled subject, it may be quite desirable to enlarge the ring by incision *before* opening the sac. This will facilitate the reduction of the bowel promptly after its exposure.

When applying plaster-of-Paris immerse the bandages, on end, in a basin of water, deep enough to cover, one at a time as needed. As the bandage is lifted out, cover each end with the fingers to prevent loss of the plaster. Squeeze gently and pull off the raveled strands.

If the extremities of the stocking, drawer-leg, stockinette or flannel bandage put next to the skin when a plaster cast is to be applied are turned down over the cast and then a few turns of the plaster bandage are made over them near but not at the edge of the cast, a neat and comfortable cuff or margin will be thus provided.

To account for a chill and pyrexia in a post-operative or post-partum course exclude pneumonia and pyogenic infection before considering malaria. On the other hand, of course, malarial recrudescences are sometimes precipitated by operation and by parturition; and too, it is important to bear in mind that malarial seizures are occasionally marked by vomiting and localized pain and tenderness in the appendix region, easily leading to a mistaken diagnosis.

Surgical Sociology

While international peace forms a subject for parlor discussion, war finds its place of action on bloody fields. The mortality among the vigorous men of different nations is sad to contemplate—and only a perennial optimist can see the time approach when the sword will be beaten into the plowshare. Nor indeed must it be forgotten that even agriculture and horticulture have an accident rate that is discreditable for such peaceful pursuits.

War with all its deadly follies exacts fewer human lives than the civil struggle for industrial supremacy. In 1908 Great Britain had about thirty-five hundred persons killed and three hundred and twenty-five thousand injured in industry, while in the United States, the roll of casualties amounted to forty thousand killed and over five hundred thousand injured.

As some writer, quoted in the Colliery Engineer, states "the tragedy through industrial accident is enacted one hundred times daily in this country or thirty-five thousand times a year. The danger to the laborer increases with the progress of the age. With each new invention the number of the killed and injured rises."

The hazards of industry are slowly coming to be of general public interest. Some day hospitals will contribute their valuable information as to the geographical sources of accidents together with unbiased testimony as to the causes and effects of industrial accidents. Today our statistics relating to the inherent risks of vocation are exceedingly limited, except for a few industries which have been regarded as extra-hazardous.

Coal mining employs seven hundred and fifty thousand men and its death toll in 1909 was seventeen hundred and seventy-nine. The number of deaths of employees from accident that occur through navigation and railroad transportation is estimated to be in excess of the mortality due to accidents in mining. Unfortunately the statistics relating to these prominent industries within the confines of this country are not sufficiently accurate to make it possible to compare the casualty figures in different sections of the country.

It is obvious that accidents must depend in part upon the non-existence of compulsory education laws. The state should compel children to remain in school and thus eliminate their early activity in those fields of labor which hasten the production of the crippled, the maimed, and the blind. Prolonged compulsory education will effect a decrease in the accident death rate.

The hazards in occupation must include, of course, those which are intrinsic and can never be eliminated because of the essential nature of the materials handled or the unusual difficulties of the processes involved. If these intrinsic hazard constituted the irreducible minimum of accidents, little blame would fall upon society. The more important type of industrial hazard is one for which employers and employees are held responsible, although the real responsibility should fall back upon society itself. There is a regrettable lack of social vision, wherefore society continues to permit preventable hazards to remain in existence. With the development of a system of pensions for widowed mothers, with the organization of just employers' liability laws, and with the creation of a systematized scheme for workingmen's insurance there will gradually develope a civic conscience that will realize in economic terms the value of preventing the wastage of American workers, men, women, and children.

The individualistic principle of the past has merely estimated that human life and limb is a cheap commodity—easily worn out but always readily procurable, so that it would be waste of time and money to reckon the cost of tissue repairs. The new social conception of industrial life considers human beings as national assets. The loss of a worker represents a decline in the nation's potential economic power. The production of invalids, widows, and crippled children creates a drain upon national resources. The old idea was cold, selfish and commercial. The new vision is warm, altruistic, and humanitarian.

Among the various subjects which have assumed international importance, none presents more striking contrasts than the subjects of peace and arbitration. The 18th day of May, the anniversary of the assembly of the first Peace Conference at The Hague, is now being observed in many schools and countries as Peace Day.

In the words of United States Commissioner Claxton, "among the many movements of modern times for the advancement of civilization and the relief of humanity from unnecessary burdens of expenditure and paralyzing war, none is more significant than that for arbitration and world wide peace."

The cost of war in terms of money does not include the cost in men. The Franco-Prussian war cost three hundred and eleven thousand lives. The Russo-Japan war involved the loss of five hundred and fifty-five thousand, nine hundred lives, and even the little warfare between Spain and the United States involved twenty thousand as a loss of life.

In this connection it is well to remember that the ordinary maximum casualty of an army approximates ten per cent. During the Franco-Prussian war the average loss in individual battles was seven per cent, though the loss per battle day was only about four per cent. It is generally estimated that twenty per cent are so badly wounded that they cannot be moved. Despite the fact that the new small caliber steel-jacketed bullet lacerates only slightly, and flesh wounds from this cause heal quickly, certainly, five per cent of the wounded succumb to their injuries.

The hospital services in connection with military procedures bear witness to the necessity for seeking for peace, national and international.

The Hague Tribunal should be given every opportunity to settle disagreements before there is any re-

course to arms. The price of armed peace is too high. The sorrowful evidences of military surgery, the decimating camp diseases, and the countless needless deaths from starvation, exposure, and infection make one realize "that war is the most futile and ferocious of human follies." Surgery is a science and an art. It is best developed through peace. Military surgery is of the emergency type and though antisepsis and asepsis have robbed it of those old arch enemies, gangrene and erysipelas, it hardly represents the highest type of surgery.

The real truth about war was well expressed in the celebrated sentences of General Sherman: "I am tired and sick of war. Its glory is all moonshine. It is only those who have neither fired a shot nor heard the shrieks and groans of the wounded who cry loud for more blood, more vengence, and more desolation. War is hell."

Book Reviews

Chirurgische Operationslehre in Drei Baenden. Von August Bier, Berlin; Heinrich Braun, Zwickau; Hermann Kuemmell, Hamburg. Band I, Lief. 1 und 3; 152 illustrations in Part 1 and 196 illustrations (mostly colored) in Part 3. Leipsig: Johann Ambrosius Barth, 1913. *Price* of Parts 1 and 3, $5.50.

It is difficult to view two parts of a book when the middle portion is absent. The latter deals with operations on the skull, brain, spine and spinal cord, and will appear in the fall of this year. The text-book promises to be monumental in scope, to judge by the fact that practically the whole of the first volume is devoted to the general principles of operative surgical treatment. This section is written by H. Braun and, as is to be expected, is very largely devoted to the principles and practice of local anesthesia. Every detail of surgical treatment (in its general aspect) is carefully considered and described with painstaking accuracy.

The second volume is developed in a masterly fashion. Passow of Berlin describes the operations on the ear, nose and throat clearly and thoroughly. Esophagoscopy and bronchoscopy are described by Killian; here we find that too much space is devoted to methods and too little to operative procedures. Wilms contributes a classical chapter on the operations in the neck; the typical and atypical procedures are described in a manner to leave no doubt in one's mind as to the author's meaning. The last section, by Rehn, deals with operations on the thyroid and thymus glands. The description of the former leaves nothing to be described, but it is to be regretted that operations upon the thymus are not described in greater detail, especially because it is well known that the best studies of the surgery of the thymus have appeared from Rehn's clinic (Klose).

The additional sections of this work on operative surgery will be reviewed as they appear and, when completed, the entire series will be reviewed.

La Pratique des Maladies des Enfants. *Tôme VIII*: Chirurgie du Crâne, du Rachis, du Thorax, du Bassin, et des Membres. Orthopédie. By M. Denucé, Professor of Surgery of Childhood in the Faculty of Medicine of Bordeaux, and M. Nové-Josserand, Professor of surgery of Childhood in the University of Lyons. Octavo; 574 pages; 287 illustrations. 1913: Pans: J. B. Balliere & Son. Price: $2.80.

This is the second volume of the series that is devoted to the surgery of childhood. Volume VII dealt with the surgery of the eye, the digestive and respiratory tracts, the heart, and the genitourinary system. The book before us is very complete in many respects incomplete in some. The subject of orthopedics in childhood is exceedingly well covered in the different sections of the work, excellently presented, and well illustrated. The various anomalies are likewise treated by the authors. Traumatic lesions of the extremities are fully described, but other lesions receive all too brief mention. As examples of the latter obstetrical paralysis and Volkmann's ischemic contracture may be mentioned. We find the work most incomplete, however, in the sections devoted to the surgery of the brain and spinal cord, many important lesions of the cerebrospinal system of children receiving little or no mention.

Particularly as an able presentation of orthopedics of childhood this volume of Denucé and Nové-Josserand can be recommended to those greatly interested in the subject. An index of the numerous references scattered throughout the book would enhance its value.

Gynecological Operations Including Non-Operative Treatment and Minor Gynecology. By Henri Hartman, Professor of the Faculty of Medicine, Paris—*Authorized Translation* By Douglas W. Sibbald, M. B., Ch.B. (Edin.), Formerly Physician to the British Hospital, Levallois—Perret, Paris. Octavo; 536 pages; 422 illustrations. Philadephia: P. Blakiston's Son & Co., 1913. Price, $7.00 net.

The work of Hartmann has has commanding importance in French medical literature. It is certainly desirable to have the opinion of this author on gynecological questions. The present translation offers this opportunity to a rather large number of specialists who are not altogether conversant with the French. The operative procedures are described with a clearness that leaves no question in the mind of the reader. There is a wide scope of gynecological surgery to the text, the operations described not being merely those preferred by Hartmann. There is the additional valuable feature of getting an insight into the judgment of this surgeon as based upon a very large personal experience.

The two chapters on minor gynecology and on physical agents in gynecology are of special instructiveness, particularly at this time when the *x*-ray is assuming a greater rôle in gynecological therapeutics.

Golden Rules of Gynecology, Aphorisms, Observations and Precepts on the Proper Diagnosis and Treatment of Diseases of Women. By George B. Norberg, M.D., Professor of Diseases of Women, University Medical College, Kansas City, Mo.: Small octavo; 250 pages. The C. V. Mosby Co., St. Louis. Price, $2.25.

This little volume forms one of the "Golden Rule Series." It is intended to embody in its 227 pages of text, golden rules in gynecology. The style is perhaps a bit too much in the imperative mood; there are so many "remembers" at the beginning of sentences and paragraphs that we cannot escape the thought that all is not gold that glitters. Certainly there cannot be so many golden rules in gynecology as are here offered to the gentle reader. A great many of the stated rules have numerous exceptions and there is much in the work that can be honestly questioned, if one look at it from a broader view-point.

Apart from this, however, there is a note of sincerity throughout the text. Two illuminating chapters on the much neglected diseases of the external female genitalia are worthy of special commendation.

Die Chirurgie der Blutgefaesse und des Herzens. Von Ernst Jeger, Berlin. Octavo; 327 pages; 231 illustrations. Berlin: August Hirschwald, 1913. *Price*, $2.25.

It is pleasant to glance through a book written in German, in which due credit is given to non-German workmen who have contributed to the subject in question. This Jeger has done and without neglect to his German colleagues. We consider his book to be by far the best critical survey of the surgery of the vascular system. At the same time, small and apparently unimportant contribu-

tions to the subject are carefully analyzed by the author because, evidently, he believes that any fact may prove of considerable importance in the future of this promising field. A number of interesting experiments that Jeger has performed are included in various parts of the book. The book can be strongly recommended to all who are interested in the subject.

Diet and Hygiene in Diseases of the Skin. By L. DUNCAN BULKLEY, A.M., M.D., Physician to the N. Y. Skin and Cancer Hospital, etc., etc. Octavo; 194 pages. New York: PAUL B. HOEBER, 1913. $2.00, net.

This book is a reproduction of the six lectures on the subject delivered by the author each year at the end of his clinical course at the N. Y. Skin and Cancer Hospital. They take account of laboratory and experimental findings, but, what is more important in the present state of our knowledge, they detail especially the original clinical observations made by a man than whom none has had a more extended experience. We commend the careful reading of these lectures to those interested who have not had the opportunity to hear them.

Solidified Carbon-Dioxide in the Successful Treatment of Cutaneous Neoplasms and Other Skin Diseases, With Special Reference to Angioma, Epithelioma and Lupus Erythematosus. By RALPH BERNSTEIN, M.D., Clinical Instructor in Skin Diseases, Hahnemann Medical College, Philadelphia; Consulting Dermatologist to the Women's Southern Homeopathic Hospital, etc., etc. Duodecimo; 95 pages. Hammond, Ill.: FRANK S. BETZ Co., 1913. *Price* 35 cents.

This little manual describes the method of preparation and of application of solidified carbon-dioxide in minutest detail. Therein lies the chief value of the work, for the author then proceeds to describe with extremest enthusiasm the results that have been achieved in the greatest variety of cutaneous diseases, and, apparently, he has not brought a careful critical analysis to bear on the subject. Albeit ready to learn of many things that solidified carbon-dioxide will do, we are not prepared to believe that it is well-nigh a cure-all in the dermatological realm.

The Diseases of the Skin. By WILLMOTT EVANS, M.D., B.S., F.R.C.S., Surgeon to the Skin Department, Royal Free Hospital; Senior Surgeon to the Hospital for Diseases of the Skin, Blackfriars. Small octavo; 375 pages; 32 illustrations. London: UNIVERSITY OF LONDON PRESS, 1912.

This is a satisfactory student's manual, too condensed for the practitioner except for elementary information.

Stuttering and Lisping. By E. W. SCRIPTURE, PH.D. (Leipzig), M.D. (Munich), Associate in Psychiatry, Columbia University; Director of the Research Laboratory of Neurology, Vanderbilt Clinic; Formerly Assistant Professor of Psychology, Yale University. Duodecimo; 251 pages; 103 illustrations. New York: THE MACMILLAN COMPANY, 1912. $1.50 net.

Scripture has given especial attention to this subject for many years, and this small volume presents the results of his observations in the treatment of stuttering and lisping. The subject is a particularly difficult one, and one which has seldom been studied scientifically. We are much indebted to Scripture for describing and establishing methods for the treatment of a condition which handicaps many persons who are otherwise normal. As the author says, it would be difficult to find a group of people more neglected by medicine and pedagogy. As a rule these unfortunates are "a source of merriment to their comrades, a torment to themselves and a constant distraction to the teacher."

This book has been written to meet the needs of physicians and teachers. If the condition is studied and treatment carried on according to the plans outlined, success can be met with in almost every instance.

Organic and Functional Nervous Diseases. A Text-Book of Neurology. By M. ALLEN STARR, M.D., PH.D., LL.D., SC.D., Professor of Neurology, Columbia University, New York, etc., etc. *Fourth Edition.* Large octavo; 970 pages; 323 engravings, and 30 plates. New York and Philadelphia: LEA AND FEBIGER, 1913. Cloth, $6, net.

The fourth edition of this standard work shows considerable enlargement and rearrangement, as well as revision of the text. The structure of the nervous system, its physiology, methods of examination, diagnosis and localization are now grouped together in Part I. Part II. deals with organic, and Part III. with functional diseases. Many recent advances in the surgery of the brain and spinal cord are referred to, but not in any detail. Regrettably, too, bibliographic references are all too few. Indeed, this work is not a treatise, but, as its title and size indicate, a comprehensive text-book.

It is interesting to note, in the section on hysteria, that Starr rejects for the most part, the teachings of Freud.

Text-Book of General and Special Pathology. For Students and Practitioners. By HENRY T. BROOKS, M.D., formerly Professor of Pathology at the New York Post-Graduate Medical School and Hospital, etc. Octavo; 1127 pages 525 illustrations in the text and 15 colored plates. Philadelphia: F. A. DAVIS Co., 1912. Cloth, $6.00.

In this work, based in large part on Langerhans' "Grundriss der Pathologischen Anatomie," Brooks has prepared a thoroughly satisfactory and modern presentment of the various phases of human pathology. It deals not only with pathologic histology, but also with a consideration of the morbid processes of most of the human diseases—toxic, bacterial, parasitic,—and with congenital malformations.

There is a section of over 150 pages devoted to the pathology of the eye, the lids and the orbit, written in collaboration with Edward L. Oatman of New York. The more condensed but also excellent exposition of immunity is contributed by Prof. Allan J. Smith of the University of Pennsylvania.

Safeguarding the Special Senses. General Advice Regarding the Use and Preservation of the Eyes, Ears, Nose and Throat. By HENRY O. REIK, M.D., Formerly Associate in Ophthalmology and Otology in the Johns Hopkins University and Surgeon in the Baltimore Eye, Ear and Throat Hospital, Baltimore, Maryland. Duodecimo; 123 pages; 4 illustrations. Philadelphia: F. A. DAVIS COMPANY, 1912. 75 cents, net.

The author of this volume has departed from the usual technical writing of books on the nose, throat and ear and has given us a short treatise that can be readily comprehended by the lay person. Definite indications are given for the prophylaxis of various diseases of these special organs, and a simple treatment is outlined for their care.

A Manual of Elementary Zoology. L. A. BORRADAILE, M.A., Lecturer in Zoology in the University of Cambridge and in Natural Sciences, Selwyn College. Duodecimo; 470 pages. London: HENRY FROWDE, Oxford University Press. HODDER AND STOUGHTON, 1912.

The affinity between the physician and the zoologist is more than an academic one. No physician can be deemed adequately equipped who does not know something of the structure of the many forms of lower animal life that may infest the human frame; while to the medical investigator a knowledge of the anatomy of animals upon whom experiments are performed is essential. For the latter, this work is eminently fitted. The anatomies of such animals as the frog, the pigeon and the rabbit are fully set forth.

In addition we find other chapters that are of more direct interest to physicians, for instance, those on the ameba, the platyhelminthes, insects, reproduction and sex, embryology and classification and evolution. The text is lucid and reveals pedagogic skill.

Progress in Surgery

A Résumé of Recent Literature.

Experiences in Spinal Surgery. CHARLES A. ELSBERG, *Surgery, Gynecology and Obstetrics,* February, 1913.

The observations of the author are based upon 70 consecutive operations for spinal disease. There were 60 primary laminectomies and 10 secondary operations. Laminectomy was performed 22 times for tumor, 9 times for section of posterior roots for pain or spasticity, 4 times for old fracture of the spine, twice for syringo and hydromyelia, once for intramedualllary cyst, once for an arterio-venons anemysin of the posterior spinal vessels, and 3 times for a peculiar disease of the roots of the cauda equina. In 13 patients not enough was found to explain the symptoms.

The operation of laminectomy in experienced hands, is neither a particularly hazardous nor a trying operation. It is of course essential for the surgeon to have a knowledge of spinal physiology and pathology. The cord should be handled with extreme gentleness as great harm can come from rough manipulation. The dura mater should always be tightly closed after the completion of a spinal operation. The closure of the laminectomy wound by the careful closure of the muscle, fascia and skin guards against leakage. So that drainage is unnecessary. In laminectomy of the lowermost dorsal or lumbar and sacral regions care should be taken to guard against soiling of the wound with feces or urine.

The presence of a positive Wassermann reaction in suspected spinal cord tumors should not absolutely contraindicate the laminectomy; as irreparable injury to the cord may be done by a gummatous growth before it has yielded to antisyphilitic remedies.

The author calls special attention to what may be called the late symptoms of spinal disease which may be likened to the late symptoms of the intracranial disease. If there has been, for a long period of time a stasis of cerebro-spinal fluid above the level of a spinal tumor, motor and sensory symptoms may occur which are due entirely to the pressure of the fluid. In the beginning, these symptoms are irritative; later they are true pressure symptoms. They may give level symptoms far above the real level.

The escape of cerebro-spinal fluid in the experience of the author has never been responsible for any untoward symptoms. Abdominal distention is a rather annoying post-operative event particularly after a laminectomy in the lower dorsal region. This, however, subsides in the course of a few days.

The results from operative interference for recent fracture of the spine with signs of serious injury to the cord have been very poor. Elsberg advises the delay of surgical interference in these cases even where the *x*-ray shows undoubted bone pressure and where there is considerable motor power left. If patients treated for a sprain or a wrench of the back were subjected to an *x*-ray examination, an injury to the bony framework of the spine would be often discovered.

The removal of an extra medullary tumor of the spinal cord is one of the most satisfactory of all operations. Intramedullary tumors must always be removed in two stages as recommended by Dr. Beer and the author. The dura should always be opened, even if an extra dural tumor has been found, for there is sometimes an intradural growth as well.

A Case of Arthropathy Without Signs of Tabes. (*Un Cas d'Arthropathie Nerveuse Sans Signes de Tabès.*) P. MAUCLAIRE and L. GIRARD, Paris. *Archives Générales de Chirurgie,* December 25, 1912.

Since Charcot first described the arthropathies associated with tabes several cases have been reported in which the joint affection is typical of disease of the nervous system, but in which there was no evidence of tabes. The authors reported an additional instance of a "Charcot joint," the right knee. The patient's husband is suffering from general paralysis; she however, has presented no other symptoms of syphilis. The lower part of the right femur had been fractured two years before the patient came under observation, but had united promptly and had given no symptoms. The swelling of the right knee began three months before the patient came under observation. Manual examination and the X-ray demonstrated a typical arthropathy. Puncture of the joint was negative. There was no sign of tabes in a careful examination of the nervous system. The Wasserman test, made after a course of mercurial treatment, was doubtful.

The other reported cases are reviewed by the authors. Syphilis was acknowledged by nearly all the patients, and the Wasserman test was positive in several. The joint condition was generally very insidious in development. Although none showed evidences of tabes syphilitic stigmata were present in all.

Histological examination of the synovia of the involved joint reveals richly vascularized tissue in which miliary gummata are present; the striking characteristic, however, is the obliterative endo-anal periarteritis. All the features of these pseudo-tabetic joints therefore closely resemble those of late hereditary lues. In fact, the examination of the pseudo-tabetic joints raises anew the question of the nature of the Charcot joint of tabes, considerable evidence now pointing to the latter as a peripheral syphilitic process and not a trophic one.

The Cure of Procidentia Uteri in Elderly Women—A New Intra-Abdominal Technique. FRED FLETCHER, *Surgery, Gynecology and Obstetrics,* February, 1913.

Fletcher does a high amputation of the cervix, an anterior colporrhaphy and a perineorrhaphy preliminary to the abdominal hysterectomy. The latter is supravaginal, severing the broad ligament flush with the uterus, and dividing the cervix at the internal os. The cervical canal is touched with iodine. The tubes and ovaries are removed with the least possible destruction of the broad ligaments. Each broad ligament stump is pulled through the opening made in the abdominal wall as in the Gilliam method of suspension for retroversion. They are then drawn taut so as to bring the cervix stump in the lower angle of the incision immediately above the pubis bone. Two sutures one on either side serve to fix the cervix stump to the lower pole of the wound. The abdomen is then closed in the usual way.

The immediate and remote result as regards fixation of the upper part of the vagina are said to be perfect.

When is the High Forceps Operation Justifiable? JAMES A. HARRAR, *The American Journal of Obstetrics,* February, 1913.

The term high forceps, as meant by Harrar, is understood to indicate application of the instrument to the fetal head when its largest diameters are still above the plane of the pelvic inlet. It thus includes the application to the floating head. The situation par excellence for the use of high forceps, is delayed dry labor in a normal pelvis, the head above the brim, and the uterus tightly contracted about the child, with the retraction ring between head and shoulders. Here version is impossible and crushing the head inadvisable. In cases of inertia uteri in multiparæ with normal pelvis, but with flabby and relaxed uterine and abdominal muscles, the high forceps is also indicated. This is preference to a version, especially where the membranes have been ruptured for a long time when version may cause a rupture of the uterus.

In a moderately flattened pelvis, uterine inertia may result from the uterus tiring in its efforts to push the head through the brim; in such case the high forceps is of good service sometimes, with the aid of the Walcher position. Again, high forceps may become justifiable in the dystocia resulting from rigidity of the cervix. Also in certain neglected cases of brow presentation in normal pelvis, the use of the forceps is of distinct service. Before deciding on a crainotomy in any given case where this comes in to competition with the forceps, it is well to consider whether a pubiotomy may not be proper as a preliminary help.

On the Cause of the Persistence of Gonorrheal Vulvovaginitis in Children. I. C. RUBIN and J. S. LEOPOLD. *American Journal of Diseases of Children,* January, 1913.

The authors have examined fifty children affected with gonorrheal vulvovaginitis and report the results of various methods of treatment, as they had all their cases under observation over an extended period of time. They advocate the use of the electrically lighted (adult) female urethroscope, which they employ as a vaginal speculum. The child is held in the dorsal position and the instrument is inserted, as a rule easily, without the use of a lubricant. By this method a careful inspection of the genital canal is possible. The authors find that contrary to some authorities, the cervix is distinctly involved in the disease. They give a detailed account of the appearance of the cervix in young children.

In spite of persistent use of all the known therapeutic procedures, including vaccine treatment, the disease was not cured. The reasons for this chronicity are given as follows:

1. The invasion is more violent and more extensive owing to (a) the close proximity of the portals of entry; (b) the tender mucosa and epidermis.
2. Once started, the infection practically develops as in a closed tube. This is not due to the valve-like closure made by the hymen, but to the construction of the perineum, and the external and internal genitals. Each segment of the vagina from the most superficial to the deepest part serves as a valve to dam back the discharge. This is due to the fact that vaginal walls are in close contact and do not permit of natural and easy drainage.
3. Crypts and adhesions in which bacteria lodge form in the vaginal mucosa.
4. The vaginal portion of the cervix shows the deepest changes and is at the same time in the most disadvantageous for drainage and for treatment.

The Application of Iodine to the External and Internal Generative Organs of Women in the Treatment of Infections and Preparation for Surgical Operations on the Same. J. WESLEY BOVEE, *American Journal Obstetrics,* February, 1913.

Bovee has found that 3½% of the crystals in 95% of alcohol is the weakest absolutely reliable preparation of iodine. This tincture is absolutely antiseptic, while at the same time not so irritating. He uses this preparation in the following conditions with good effect: 1. Acute infections of the vulva, vagina, uretha, and the whole of the endometrium. 2. Acute peritoneal infections with proper limitations. 3. Chronic conditions following infections of these structures of the tubes, ovaries and pelvic peritoneum. 4. In pelvic surgery requiring examinations, manipulations or operations on or through the vagina. 5. In such procedures as require opening the cervical canal or uterine cavity from either the vaginal or peritoneal side. 6. As a routine method of the field of operation on all these structures, as well as the rectum.

Has Pituitrin Deleterious Influence Upon the Child? (*Hat das Pituitrin einen Nachteiligen Einfluss auf das Kind?*), F. Spaeth, *Zentralblatt f. Gynäkologie,* February 1, 1913.

On the observation of an asphyxiated child born in breech presentation, and in which the heart-beat was seen and felt to be extremely slow soon after birth—the latter being induced by two injections of pituitrin, Spaeth raises the question of whether the administration of this organic drug is not sometimes fatal to the child, as in his own experience. The autopsy of the infant proved entirely negative, pointing strongly to a direct relationship between the pituitrin and the fatal intoxication in the child. The management of the labor was very easy and in no way could be taken into account of the fatality. Spaeth suggests that in the future it would be well to control the effect of the first injection upon the fetal heart, before endangering the life of the fetus by an overdose of pituitrin.

Hypophysis Extract and Delayed Labor. (*Hypophysenextrakt und Spätgeburt*) Lucius Stolpher, *Zentralblatt f. Gynäkologie,* February 1, 1913.

Stolper has employed pituitrin to induce labor in women past the calculated time for delivery. In one case after two injections of pituglandol, 12 days after the awaited time for delivery, he succeeded in inducing labor pains which resulted in the birth of a large child 5 hours after the first injection. In another case 4 injections were necessary to terminate labor, six hours elapsing from the first injection. The first injection is usually without effect, but the second dose of 1c.c. pituitrin stimulates active labor pains. This procedure is to be recommended in cases of women who are prone to carry their pregnancy beyond the normal limit, giving birth to large children and undergoing difficult labor.

Pulsations Observed in the Primitive Cardiac Tube of a Human Embryo in the Second Week. WILLIAM F. ARMANN, *American Journal of Obstetrics,* February, 1913.

In a patient seen for severe genital hemorrhage following a period of amenorrhea of six weeks, Armann found a number of clots, one of which proved to be an intact ovum. This was as large as a hazel nut and contained an embryo of 2.5 millimeters. The yolk sac was distended and as large as a lentil. There were distinct rythmical pulsations of the primitive heart counting 90 pulsations to the minute. The cardiac tube was as large as the head of a pin, and no anticle or ventricle could be determined. By comparison with other young embryos, the specimen may be considered as 14 days old. The case is reported as probably the earliest stage at which cardiac pulsation has ever been observed in a human embryo.

The Influence of Myomata on the Blood Supply of the Uterus, With Special Reference to Abnormal Uterine Bleeding. JOHN A. SAMPSON, *Surgery, Gynecology and Obstetrics,* February, 1913.

From Sampson's studies on 150 injected myomatous uteri, he comes to the conclusion that the normal menstrual flow is entirely a venous hemorrhage from the venous plexus of the endometrium, and it is only possible when there are changes in this plexus which will permit the blood to escape.

The myometrium is apparently an important factor in the control of physiological uterine bleeding. A great factor in preventing the escape of the blood contained in the uterus into the uterine cavity is the tonicity of the uterus. Under abnormal conditions of uterine inefficiency, the most important single factor being muscular insufficiency, menstruation may become prolonged and more profuse, and there may be irregular or inter-menstrual bleeding.

Small subserous myomata are relatively anæmic and do not have any appreciable influence on the uterine circulation. Large subserous myomata are very vascular (arterial), and cause a hypertrophy of the uterine artery from which their untrient artery arises, and thus more blood is carried to the uterus and tumor, the excess over the normal being diverted to the tumor. More venous blood is carried back to the uterine veins. Small intramural myomata are less vascular than the myometrium and apparently have very little influence on the circulation of the uterus, and usually menstruation is not altered.

Larger intramural myomata are apt to induce uterine hemorrhage, as do the submucous variety which are a later stage of the intramural variety. Menstruation may, however, be entirely uninfluenced by the myomata.

The Question of Conservative Treatment of Myomata. (*Zur Frage der konservativen Myom-Behandlung*) MACKENRODT, *Zentralbl. für Gynäkology,* January 4, 1913.

Mackenrodt's myoma cases comprise 418 of which 14 were treated by curettage, 167 conservatively i. e.; 54 by vaginal enucleation (1 death); 93 abdominal enucleations (1 death) and 6 partial corpus amputations (Fundus am-

putations). 200 cases were treated radically, i. e.; 66 by vaginal total extripation (1 death), 134 abdominal panhysterectomy (14 deaths chiefly through ovarian carcinoma; excluding these, the mortality was only 3%) and 52 by supra-vaginal hysterectomy (2 deaths). In the enucleation, the uterine cavity should not be opened. If the latter does take place, suture should not close the mucosa, rather leave this open for drainage but close the myoma bed. Enucleation should be practiced whenever possible for the future possibility of child-bearing. The X-ray should have a restricted therapeutic application. Mackenrodt considers that only 48 out of his series of 418 cases were really suitable for X-ray treatment. In this series there were 170 large myomata, 32 carcinoma and sarcoma, 87 ovarian tumors, 2 septic suppurations, 40 submucous myomata 2 calcified, 4 degenerated, 4 complicating pregnancy, 23 adenomyoma and in 3 cases the ureters were incarcerated within the myoma. These cases are surely not amenable to the X-ray.

Superficial Metastatic Growths in the Diagnosis of Deep-Seated Malignant Tumors. W. WAYNE BABCOCK, Philadelphia, *New York Medical Journal*, January 18, 1913.

In a short article Babcock shows the importance of examination of superficial metastatic growths especially lymph-nodes. He cites several cases in which examination of a node removed under local anaesthesia made possible the diagnosis of otherwise extremely obscure conditions. Examination of such superficial or subcutaneous nodules avoid the dangers that may attend the removal of a section from the primary growth. The author states that such superficial metastases are more frequent than is generally supposed and believes that if looked for more carefully, would be more often found. In gastric cancer, the lymph-nodes above the left clavicle may be involved; in carcinoma of the liver or peritoneum, metastasis may occur along the round ligament and a secondary nodule appear at the umbilicus; in cancer of the breast there is frequently a macular eruption in the skin overlying the tumor, which is characteristic and which on microscopic examination gives definite proof that the growth is a far advanced carcinoma.

Malignant Growths: A Plea for More Conservative Treatment. RUSSELL H. BOGGS, Pittsburgh, *New York Medical Journal*, January 25, 1913.

Boggs comments on the fact that as Murphy and others have shown, when a large number of cases of carcinoma is followed up after operation for a considerable period of time, the end results (even in cases where no metastasis were present) were very discouraging. As an example he cites Murphy, who found that of patients with cancer of the lip in whom no metastasis were present, fifty-two per cent died a cancer death in spite of operative interference. Boggs believes that X-ray treatment is of much more value than is generally supposed and describes numerous cases of new growths illustrating this. His conclusions are as follows:

1. More conservative treatment of malignant growths must be practised in order to secure more positive results in curable cases, and effect greater palliation in hopeless cases.

2. Degree and location of malignancy should determine the treatment.

3. Good results follow from early operations when favorably situated.

4. Post-operative Röntgen treatment, even in these early operations, decreases recurrences.

5. Some unfavorable cases can be made more favorable for operation by anteoperative treatment.

6. Hopeless cases which have not been operated in derive more benefit in comparison with hopeless recurrent cases.

7. With many the Röntgen ray is superseding all other methods, even excision radically performed, in the treatment of epithelioma, unless it involves mucous membrane.

Suspension Laryngoscopy. L. G. KAEMPFER, New York, *New York Medical Journal*, January 4, 1913.

Under the name of suspension laryngoscopy, Kaempfer describes a new procedure, recently perfected by Killian under the name of "Schwebe Laryngoskopie." It consists in direct laryngoscopy with the patient lying prone, the larynx being brought into view by means of a spatula which is put into the mouth beyond the epiglottis. This spatula is attached to a long hook which is hung on a support fastened to the table on which the patient lies. The head of the patient is thus suspended and the operator standing behind the patient, gets an excellent view of the larynx, the tongue and epiglottis being kept out of view by the spatula. By this means the larynx is brought so near to the operator that manipulations are permitted which would be impossible by any other method of approach. Besides this the operator has both hands free. The larynx is also more accessible and secretions and blood may be easily sponged away, so that much more radical intralaryngeal work can be done. The writer says that the method is especially useful for cases of tubercular laryngitis and papillomata.

The Operative Treatment of Cleft Palate. PHILIP WEATHERBE, Halifax, N. S. *The Canadian Medical Association Journal.* January, 1913.

The author states that at the present time there are three distinct methods by which a cleft palate may be closed, and that each one of these has its adherents. These methods are (1) that of Brophy; (2) that of Arbuthnot Lane, (3) that of Langenbeck, known as the median operation.

Brophy's operation, which consists of drawing together the two maxillary bones by means of wires inserted beneath the cheek, must be performed at a very early age, best before the third week, although at the hands of its originator it has met with success, others have condemned it.

Theoretically and scientifically Lane's flap method is apparently the best. There is no case unsuited for the method and very wide clefts may be closed. The lip is operated on at the same time as the palate. This operation may also be performed at an early age, when there is least shock and while the child is still in good condition. The hard palate only, may be closed by this method and the soft palate may be left for treatment at a later date.

The adherents of Langenbeck's method lay great stress on the early repair of the soft palate, which they believe greatly influences the character of the resulting power of speech. Articulation is much improved by early closure of the cleft in the soft palate.

The evidence is not sufficiently strong to convince one as to which is the best method.

There is no doubt that whatever method is followed, there must be efficient after training in speech to produce distinct articulation, and the omission of this training accounts for many failures. Until recently enough stress had not been laid upon this important factor.

With the more recent improvements, a successful operation may be done by the median method at an earlier age than formerly.

In so delicate an operation much depends upon the anesthetist, the assistant and the nursing.

Contribution to the Therapy of Otitis Externa Furunculosa. *Zur Therapie der Otitis Externa Furunculosa.*) A. ZOGRAFIDES, Athens, *Wiener Klinische Wochenschrift*, December 19, 1912.

After disinfection of the auditory canal, the author recommends that four or five incisions be made through the furuncle, followed by a wet dressing of 10% carbolic acid. With this method the pain ceases at the end of two hours. No other method in the author's experience gives nearly as effectual relief.

Clinical Study of Diffuse Retroperitoneal Inflammation and its Relation to Peritonitis. (*Klinische Beitraege zu den Diffusen Entzuendlichen Erkrankungen des Retroperitoneums und Ihre Stellung zur Peritonitis*). SPRENGEL, Braunschweig. *Archiv fuer Klinische Chirurgie,* Vol. 101, Part II.

This condition has never received an adequate description although cases have unquestionably been seen not very infrequently by many surgeons. Sprengel presents a number of cases of diffuse retroperitoneal suppuration in a very frank manner, pointing out mistakes in diagnosis and treatment. His object in describing the condition is to call attention to its existence and to stimulate further work in the field. All of his cases ended fatally.

When the retroperitoneal suppuration complicates inflammation in the upper abdomen (most often pancreatitis and biliary and hepatic disease) the diagnosis may be made with a fair degree of certainty. There is fulness of the abdomen in its upper half, the lower abdomen being free. The fulness is chiefly in the lateral regions; and does not shift on changing the position of the patient.

The above-mentioned symptoms may be present in retroperitoneal inflammation in the lower abdomen. The symptoms that may, in general, aid in differentiating retroperitoneal from intra-peritoneal inflammation are: the generalized deep tenderness and absent superficial tenderness and pain, absence of peritoneal symptoms with the rapid development of deep-seated symptoms in the first few days. Secondary peritonitis often develops soon after retroperitonitis, in many instances, so that the picture is rarely a clear one. In fact the retroperitoneal condition is not generally discovered until the post-mortem examination.

Permanent Drainage for Ascites. (*Über Versuche mit Dauerdrainage Bei Ascites*) DR. PERIMOFF, KAZAN, Russia, *Zentrablatt für Chirurgie,* January 4, 1913.

Perimoff reports a case of a boy, 12 years old, suffering from a huge ascites resulting from syphilitic cirrhosis. He made a transverse bow-shaped incision between the iphoid cartilage and the umbilicus, the apex of the bow being in the center. He then opened the peritoneum and sewed into the lower angle a silver tube, 1.5. cm. in diameter, which had flange ends. The skin was then sutured over the tube so that the anterior opening communicated directly with the subcutaneous tissues. At the end of thirty-five days, the patient is still free from ascites, and his general condition is much improved. Perimoff suggests this operation as a substitute for the Talma operation, which is far more formidable.

The Early Diagnosis of Acute Perforation of the Stomach. (*Zur Fruehdiagnose der Acuten Magenperforation.*) D. KULENKAMPFF, Zwickan. *Deutsche Medizinische Wochenschrift,* January 16, 1913.

The difficulty of early diagnosis of perforation of a gastric ulcer stimulated the author to attempt to employ some methods to aid in the diagnosis. He believes that tenderness in Douglas' pouch, though not pathognomonic, points very strongly toward perforation at an early stage. When generalized peritonitis is present rectal tenderness is of course of no localizing significance. Kulenkampff reports a case in which generalized abdominal cramps (no vomiting, no previous gastric symptoms) began 3 hours before the patient (a male) came under observation. The liver dulness was normal, no moveable dulness in the flanks. Pronounced tenderness in the rectovesical pouch. Operation revealed a pin-point perforation of a gastric ulcer; there was no fluid in the general peritoneal cavity and no adhesions about the ulcer.

Traumatic Shock and the Employment of Blood Pressure Estimation in Its Prevention and Treatment. JOSEPH C. BLOODGOOD, Baltimore. *The International Journal of Surgery,* January, 1913.

Much of the post-operative mortality, complications, prolonged and uncomfortable convalescence is due to shock. Shock is due to many factors, some of which are avoidable. The important point is that, if the factors are unavoidable, the recognition of the early stages of shock is possible by the use of a blood-pressure apparatus when its existence is as yet clinically recognizable. Bloodgood has the pressure readings taken the day before operation, during anesthesia, and during operation; finally, after operation and before the patient is removed to the ward. Ordinarily the pressure rises during anesthesia and falls during painful manipulations, but rises promptly when the manipulations are stopped. If the rise does not occur, shock is impending and treatment should at once be instituted. Likewise, a persistently low pressure after operation indicates shock and the patient should not leave the operating room until the pressure has again risen to that present before operation.

The Increased Danger From Loss of Blood at Operation in Cases of Congenitally Narrow Aorta. (*Ueber die Erhöhten Gefahren Operativer Blutverluste bei Angeborene Enge des Aorten Systems.*) E. MELCHIOR, Breslau, *Deutsche Medizinische Wochenschrift,* January 23, 1913.

Two cases reported in which the moderate loss of blood at operation led to death. Furthermore, in both these patients much more bleeding was encountered than was expected as a result of the operative manipulations; in one of these patients hemophilia was suspected but could not be diagnosed. In neither instance, however, could the loss of blood be termed very marked. No other cause for death could be found at the post-mortem examinations. The aorta was found congenitally narrowed in both cases. The author therefore suggests the association between the active condition and the tendency to a fatal issue in moderate loss of blood at operation.

Tissue Cultures Outside the Body With Especial Reference to Adult Animal Growth. (*Ueber Gewebskulturen In Vitro unter Besonderer Berueecksichtigung der Gewebe Erwachsene Tiere*). A. DILGER, Heidelberg. *Deutsche Zeitschrift fuer Chirurgie,* January, 1913.

The work of Burrows and Carrel was repeated by Dilger in order to ascertain the nature of growth outside the body. He seems to have carefully followed the described technic but could not conclude, from his work, that true tissue growth takes place. He believes that the apparent growth at the periphery of "tissue cultures" is really a wandering of the cells from the interior. The author ends his paper by stating his agreement with the conclusions of Jolly, namely:

"In résumé, the findings of Carrel and Burrows are not distinctly new. They repeat previous researches, in which very interesting results had indeed been obtained. To the present Carrel and Burrows have demonstrated phenomena of survival alone. In fact, some of their reports even seem to be descriptions of necrobiosis. In certain tissues, in vitro, cellular multiplication appeared to continue for some time, which was known. But an abyss, possibly to be crossed at a future time, exists between this final effect of some cells and a 'culture' of continuous and progressive development. At the present time, it is an abuse of language, to apply the term 'culture' to the results obtained."

The above is a translation from the conclusion of Jolly quoted by Dilger. Jolly's report appeared in "Compt. Rend. de la Soc. de Biol.," 1910, II, Vol. 69.

Study of the Chemistry of Renal Calculi. MAX KAHN, New York, *Archives of Internal Medicine,* January 15, 1913.

(1) The large majority of renal stones are composed of the oxalate of lime; sometimes the calcium salt is the only component of the stone.

(2) Uric acid and the urates are found in small quantities in all venal calculi, but it is rare to find a nephric stone composed mainly of uric acid or urates.

(3) The shape, color, consistency, etc. of a stone do not constitute criteria of chemical composition.